3.3 MARINE BIOLOGICAL RESOURCES

This section describes environmental and regulatory settings related to the offshore biological resources in the Broad Beach Restoration Area (Project area) and Off-site Project areas, and potential effects of the beach replenishment project on public trust resources and values.

3.3.1 Environmental Setting Pertaining to the Public Trust

3.3.1.1 Project Location

Project Area Location and Description

The Project area is located at Broad Beach in the city of Malibu, which lies along the coast in the northwestern portion of Los Angeles County. The area directly affected by the Project extends laterally for more than 6,700 feet from the rocky headland of Lechuza Point to the western parking lot for Zuma Beach County Park at Trancas Creek, and includes the nearshore waters offshore Broad Beach that could be impacted by the construction and maintenance of the Project.

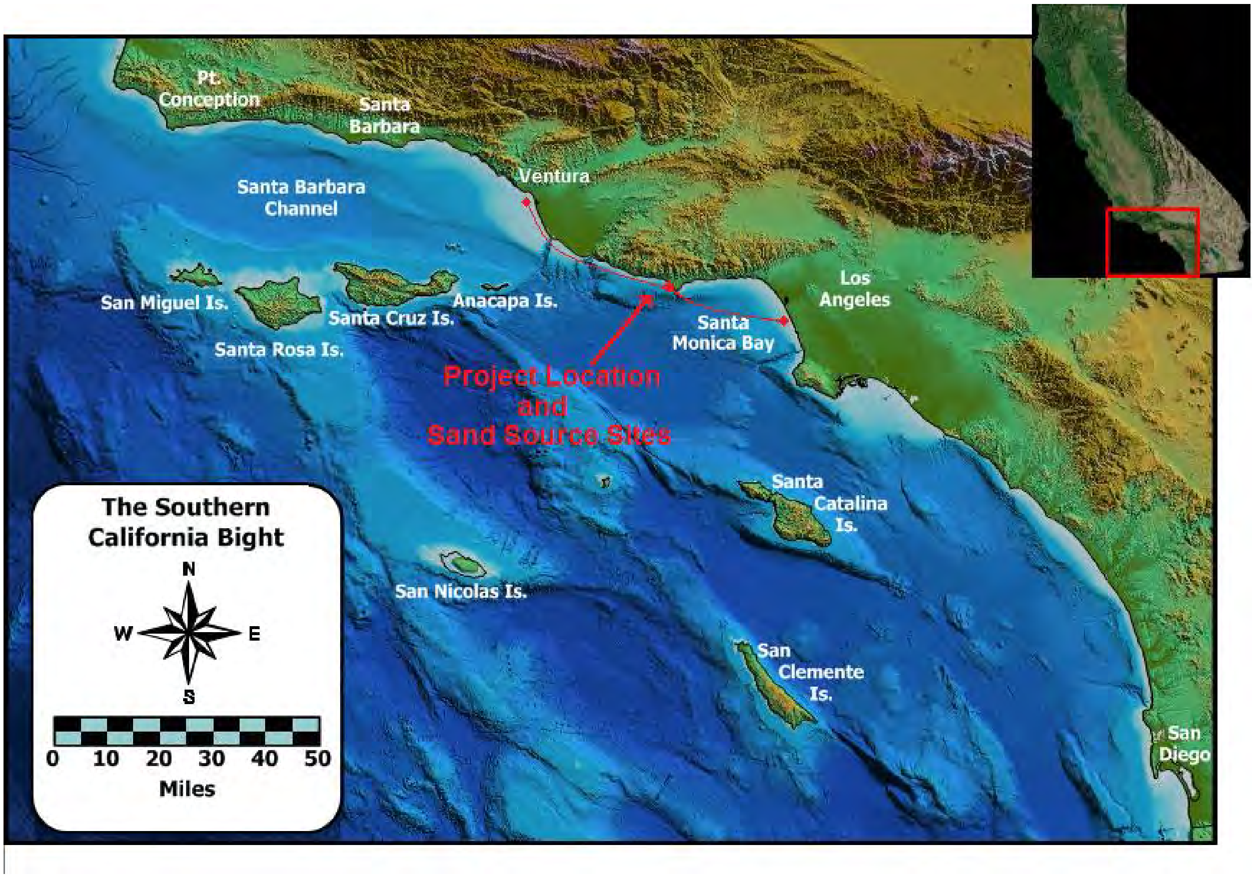
Off-site Project Area Location and Description

The Project also includes three offshore sand source sites: Central Trancas, Dockweiler, and Ventura. The Dockweiler site is located approximately 0.25 miles offshore of Dockweiler State Beach in Los Angeles County, while the Ventura site is located immediately outside Ventura Harbor, in Ventura County. The Central Trancas site is located approximately 0.25 miles offshore of the eastern segment of Broad Beach and is the fine-grained sand source area proposed for use in the dune restoration component of the Project. Vessel transit routes for dredged material, and State tidelands in the vicinity of these waters, are also considered part of the Off-site Project areas.

3.3.1.2 Project Area Overview

Broad Beach and the proposed sand sources are within a geographic region commonly known as the Southern California Bight (SCB), wherein the characteristic north-south trending coastline found off much of western North America experiences a significant curvature or indentation south of Point Conception. The SCB includes coastal southern California, the Channel Islands, and the local portion of the Pacific Ocean (Figure 3.3-1).

Figure 3.3-1. Project Location within the Southern California Bight



The portion of the Pacific Ocean that occupies this region, from Point Conception in the north to just past San Diego in the south and extending offshore of San Nicolas Island, is characterized by complex current circulation patterns and a diverse range of marine habitats. The mainland coast and offshore islands contain rocky shores, long stretches of sandy beach, and numerous embayments. A complex series of submarine canyons, ridges, and basins that exceed depths of several thousand feet lie between the mainland and islands. The wide variety of habitats found in the SCB allow rich and varied marine life.

Marine biological resources in the Project vicinity can be described in terms of three major habitat areas: open ocean, seafloor (soft-bottom and hard-bottom), and shoreline. Within the SCB, each of these three biological habitats is exceptionally diverse and productive. For example, many of the more than 600 fish species reported along the Pacific Outer Continental Shelf (OCS) region occur within the SCB. Eelgrass (*Zostera* spp.) beds, considered to be one of the most productive habitat types found on soft-bottom substrate, occur along the protected shoreline of the SCB, while rocky nearshore substrates often support dense stands of kelp (*Macrocystis* spp.) Additionally, every year more than 27 species of whales and dolphins visit or inhabit the region, including blue whales (*Balaenoptera musculus*), humpback whales (*Megaptera* *novaeangliae*), and gray whales (*Eschrichtius robustus*). Several species of marine mammals and numerous seabird species preferentially use the shores of the nearby Channel Islands and rocky outcroppings along the mainland coast as haul-outs and rookeries. The following discussion summarizes the various habitats, marine flora and fauna, rare and endangered species, and other protected species that exist in the Project area and Off-site Project areas. This section discusses marine biological resources in the context of their associated habitat, and is organized into the following sections: open-ocean, seafloor (soft-bottomed and hard-bottomed), and shoreline. Following the sections regarding habitats and associated biota, there is a discussion of sport and commercial fishing resources, marine resource protection areas, ocean acoustics, and marine invasive species.

3.3.1.3 Open-ocean Habitat and Biota

Open-ocean, or pelagic, habitat refers to the coastal and open-ocean regions of water above the benthos and away from the shoreline. Organisms utilizing resources in this zone often spend most, if not all, of their lives in a three-dimensional matrix of water, rarely encountering any substrate on which to attach or subsist. This section describes the organisms that are found in the open ocean in and around the Project area. A definition and description of plankton, an important element of the marine food web, is provided, followed by a discussion of the fish, marine mammals and reptiles that inhabit the open ocean.

<u>Plankton</u>

Plankton are aquatic organisms that have either limited or no swimming ability and therefore drift or float with the ocean currents. Plankton include both phytoplankton (plants) and zooplankton (animals).

Phytoplankton, or plant plankton, form the base of the marine food web in the Project vicinity by photosynthesizing organic matter from water, carbon dioxide, and light. Phytoplankton are usually unicellular or colonial algae and provide a food source for zooplankton and fish. Through their decay, phytoplankton also support large quantities of marine bacteria.

Zooplankton, or animal plankton, are the primary link between phytoplankton and larger organisms in marine food webs. Zooplankton include a wide array of organisms that may spend all or only a portion of their life cycle as plankton. All zooplankton, including the larval stages of larger organisms, consume other organisms or organic material.

Plankton distribution in California waters tends to be patchy and is characterized by high seasonal and inter-annual variability. Generally, plankton distribution, abundance, and productivity are dependent on light, nutrients, water quality, terrestrial runoff, and upwelling Data from several studies (e.g., Bolin and Abbott 1963, Allen 1945) have indicated that the phytoplankton community is similar in species composition along the entire coast of California. Dinoflagellates are usually dominant in the water column; however, diatoms may dominate the community under certain circumstances, such as during upwelling conditions or after intense rainstorms (MBC 1994).

Fish

Fish are generally separated into two major groups based on whether they have a bony skeleton (Class Osteichthyes) or rely on cartilage for support (Class Chondrichthyes), (e.g., sharks and rays). The dominant pelagic bony fish species in the area are comprised of Pacific or chub mackerel (*Scomber japonicus*), jack mackerel (*Trachurus symmetricus*), northern anchovy, and Pacific sardine. These species are also the primary targets of the southern California commercial fishing industry. Meanwhile, sharks are the dominant cartilaginous fish in the pelagic environment throughout the region, although their abundance has declined in recent decades.

Epipelagic Fish

Epipelagic fish reside in the open ocean down to depths of approximately 656 feet, where waters are well mixed and support photosynthetic algal communities (i.e., they are well lit). Many epipelagic species within the SCB, including large predators (e.g., tuna, sharks, swordfish, and forage fish) such as northern anchovy, Pacific sardine, Pacific saury (*Cololabis saira*), and Pacific hake (*Merluccius productus*), are widely distributed along the California coast. Some species, such as albacore tuna and salmon, are known to migrate extensively over vast areas of the Pacific. Pelagic sport fish such as yellowtail (*Seriola lalandi*) and Pacific barracuda (*Sphyraena argentea*) are migratory species that move northward in the spring and summer and are often particularly abundant off the coast during El Niño years. In contrast, other species, such as rockfish (Scorpaenidae), may live out their entire lives around the offshore oil platforms and natural reefs within the region.

Other species found in Santa Monica Bay include queenfish, jacksmelt (*Atherinopsis californiensis*), and topsmelt (*Atherinops affinis*) in shallow depths, and rockfish (*Sebastes* spp.) along the outer shelf. White croaker and white seaperch (*Phanerodon furcatus*) school in the water column but feed on the bottom. Vermillion rockfish (*Sebastes miniatus*), bocaccio (*Sebastes paucispinis*), and sablefish (*Anoplopoma fimbria*) feed in the water column at night but remain associated with the bottom during the day (MBC 1993).

At least 40 species of sharks and rays are known to occur in the greater SCB region. Some large sharks may inhabit the SCB during seasonal migrations, while others may permanently reside in the area. Many smaller sharks and rays are permanent residents of the nearshore coastal areas. Leopard sharks (*Triakis semifasciata*), for example, are one of the most common sharks in California bays and estuaries and along southern

California beaches. They are a popular sport fish in nearshore waters, where they are commonly caught from piers and jetties. Historically, the most abundant sharks in the region include blue sharks (*Prionace glauca*), thresher sharks (*Alopias vulpinus*), and basking sharks (*Cetorhinus maximus*). Shark species also support several important commercial fisheries in the region, most notably thresher, mako (*Isurus* spp.), and blue sharks.

Large great white sharks (*Carcharodon carcharias*) are uncommon in southern California; however, several of the juvenile white sharks displayed at the Monterey Bay Aquarium in the past decade have been captured from the waters in or near Santa Monica Bay. White sharks are thought to give birth in southern California waters, and use inshore waters as a nursery area. Great white sharks feed on fish, rays, and small sharks.

Demersal Fish

The extensive soft-bottom habitats within Santa Monica Bay support an abundant and diverse assemblage of more than 100 species of demersal (living on or just above the bottom) fish. Flatfish (Families Pleuronectidae, Paralichthyidae, Cynoglossidae, and Bothidae), rockfish (Family Scorpaenidae), sculpins (Family Cottidae), combfish (Family Zaniolepididae), and eelpouts (Family Zoarcidae) make up most of the soft-bottom fish fauna in the Bay (MBC 1993). The inner shelf assemblage is dominated by speckled sanddab (*Citharichthys stigmaeus*), the middle shelf by stripetail rockfish (*Sebastes saxicola*), and the outer shelf by slender sole (*Lyopsetta exilis*) (Allen 1982).

Dominant species collected in otter trawl surveys along the 20-, 40-, and 60–foot isobaths near Scattergood and El Segundo Generating Stations in 1988 included white croaker, queenfish, speckled sanddab, spotted turbot (*Pleuronichthys ritteri*), and California halibut (OC 1989). The following year, 1989, otter trawl surveys near the Hyperion Treatment Plant distinguished five demersal fish assemblages in the area. The dominant species found nearshore included horneyhead turbot (*P. verticalis*), speckled sanddab, California tonguefish (*Symphurus atricauda*), white croaker, and California halibut. Protected Fish Species.

California Grunion. A well-known intertidal visitor, the California grunion, is the subject of a unique recreational fishery in the region, and is protected by local law. This small inshore fish is endemic to southern California, and serves as a significant food source for larger nearshore fish. The species is unusual because it "comes ashore" on sandy beaches to spawn. Female grunion can spawn as many as six times during a season, laying between 1,600 and 3,600 eggs each time, with larger females producing more eggs.

Spawning generally occurs from March through August, peaking from April through June, and coincides with the peak of the high tide during and just after high spring tides

(tides of highest magnitude during new and full moons). During these high tides, spawning females come ashore and use their tails to dig in to the moist sand high up in the intertidal zone to lay their eggs. A number of males then curl around the embedded female and attempt to fertilize the eggs. The adult fish leave on succeeding waves while the eggs remain.

The grunion eggs incubate in the sand during the lower tide levels, kept moist by residual water in the sand. There, they are safe from the disturbance of wave action until the next spring tides, approximately 10 days to 2 weeks later. During these high tides, as water agitates and inundates the eggs, they hatch and the larvae are carried out to sea. Grunion are harvested by hand as they come ashore to spawn.

Although grunion are not listed as threatened or endangered, National Marine Fisheries Service (NMFS) requires that their eggs be protected from disturbance, and the Malibu General Plan recognizes their spawning grounds as a sensitive marine resource. Grunion runs were monitored at Broad Beach between March and August, 2010 (Buena 2010). No grunion were observed in the Project area, although grunion were observed to spawn just east of the Project area on Zuma Beach near Trancas Creek.

<u>Marine Birds</u>

The SCB supports a rich population of seabirds (Baird 1993), providing a major foraging area for both residents and migrants. Much of the taxonomic diversity in the region arises because the SCB acts as the transition zone between two zoogeographic provinces. The northern portions of the SCB (i.e., the Santa Barbara Channel), support boreal seabird populations, such as Cassin's auklets, that are more characteristic of colder regions as far north as the Gulf of Alaska. Conversely, the Channel Islands also harbor important nesting colonies for subtropical seabirds, such as those found in the Gulf of California. The latter include California's entire nesting populations of both the recently delisted California brown pelican (*Pelecanus occidentalis californicus*), and the state-threatened Xantus's murrelet (*Synthliboramphus hypoleucus*). Both species have southern breeding distributions and also nest on islands off Baja California. As such, the distribution of the various seabird taxa within the region exhibits substantial seasonal and spatial variation (Pierson et al. 1999, MMS 2001).

Seabirds can be segregated into two main groups, coastal and pelagic. Coastal seabirds feed in the pelagic realm but tend to remain within approximately 5 miles of the mainland shore. Common coastal seabirds include Western and Clark's grebes, surf scoters (*Melanitta perspicillata*), cormorants (*Phalacrocorax* spp.), loons (*Gavia* spp.), California brown pelicans, and gulls (Subfamily Laridae). The highest coastal seabird densities occur in the SCB during winter months. However, California brown pelican populations generally peak in the summer months when birds from larger Mexican colonies migrate northward.

In contrast, pelagic seabirds spend most of their time farther from shore. As with coastal seabirds, they spend much of their time on the sea surface or diving into the water column to feed. Some of the most common offshore birds in the region include: shearwaters (*Puffinus* spp.), northern fulmars (*Fulmarus glacialis*), phalaropes (*Phalaropus* spp.), jaegers (*Stercorarius* spp.), and common murres (*Uria aalge*). Storm-petrels (*Oceanodroma* spp.), puffins (*Fratercula* spp.), and auklets (Family Alcidae) also frequent the offshore waters of the Project area. Seasonal population peaks vary among the taxa, but pelagic seabirds, as a group, are comparatively stable (MMS 2001). Most seabird rookeries in the region are located on offshore islands, predominately the northern Channel Islands; few, if any, seabirds nest on the mainland coast of the SCB (Carter et al. 1992).

Feeding strategies vary among seabirds, with California brown pelicans and terns, including the endangered California least tern (*Sterna antillarum browni*), diving into the water from the air to catch fish, while cormorants (*Phalacrocorax* spp.), murres, puffins, and auklets dive from the sea surface in pursuit of fish and zooplankton. Red-necked phalaropes (*Phalaropus lobatus*) feed at the sea surface using a characteristic spinning pattern that causes fish eggs and other planktonic species to accumulate immediately underneath them.

Protected Marine Bird Species

Description are provided below for the special status marine bird species that are reasonably likely to be encountered offshore Broad Beach, near the borrow sites, or along the transit routes between the borrow sites and Broad Beach. Seabird species occurring in the Project vicinity that are protected under either the State or Federal Endangered Species Acts (ESA) include the State threatened Xantus's murrelet (*Synthliboramphus hypoleucus*), and the State endangered bald eagle (*Haliaeetus leucocephalus*). Table 3.3-1 includes several additional seabirds classified as species of concern by CDFG. Finally, although the California brown pelican was delisted from both the Federal and State endangered species lists in 2009, it remains a State fully protected species. Special status shorebirds such as the western snowy plover and California least tern are addressed in Section 3.4, *Terrestrial Biological Resources*.

Bald Eagle. Until 2007, the bald eagle was a listed species protected under the Federal ESA; however, it currently remains listed as an endangered species in California. While bald eagle population precipitously declined earlier this century, this species has now successfully nested on four of the Chanel Islands, Catalina, Santa Cruz, Anacapa, and Santa Rosa. The population of bald eagles on the Channel Islands is currently believed to number between 60 and 70 birds. Bald eagles range widely throughout the year, with many of the island residents making forays or extended visits to the mainland, including in the vicinity of the Project area and near the proposed sand source sites.

Table 3.3-1. Special Status Seabirds Occurring in the Project Area

Common Name	Scientific Name	Status
Bald eagle	*Haliaeetus leucocephalus*	State Endangered, SFPS [1]
Xantus's murrelet	*Synthliboramphus hypoleucus*	State Threatened
Ashy storm-petrel	*Oceanodroma homochroa*	SSC
Black storm-petrel	*Oceanodroma melania*	SSC
Cassin's auklet	*Ptychoramphus aleuticus*	SSC
California brown pelican	*Pelecanus occidentalis californicus*	SFPS[1]

Notes: SSC = State Species of Special Concern; SFPS = State Fully Protected Species
[1] Delisted from the Federal ESA in 2007.
[2] Delisted from the Federal ESA in 2009.

Xantus's Murrelet. The Xantus's murrelet is a small diving bird of the family Alcidae, which includes puffins and murres. It is listed as threatened by the State of California, and is currently a candidate for listing under the Federal ESA because of its limited breeding range, small and declining global population size, and vulnerability to multiple threats, including predation, oil spills, and loss of habitat (Wolf et al. 2005). The murrelet breeds on islands between Point Conception, California, and Punta Abreojos in Baja California. The entire global population is currently estimated between 5,000 and 10,000 breeding pairs, while approximately 3,000 birds breed on the Channel Islands, primarily Santa Barbara Island.

Murrelets subsist on zooplankton and small fish including northern anchovies, sardines, rockfish, Pacific sauries, and crustaceans. They spend most of their lives at sea, far from the mainland, and come ashore only to breed. Their nesting period extends from February through July, but may vary depending on food supplies. During the nesting season, they forage in the immediate vicinity of the colony. Nests are located in natural rock crevices or under shrubs, especially along or near cliffs.

Current threats to the population of Xantus's murrelet include native and non-native predators and competitors, oil pollution, changes in oceanography and prey availability, and by-catch in fisheries. Recently, concerns have also arisen over the effects of artificial light pollution from fishing and other vessels that overnight near the island colonies, potentially attracting birds to their death by collision or contamination aboard ship.

Storm Petrels and Auklets. Ashy and black storm-petrels are pelagic, nocturnal, cavity-nesting birds that come ashore primarily for breeding-related activities. Their primarily nocturnal behavior is thought to be an evolutionary adaptation to limit predation by diurnal predators such as gulls. Conversely, Cassin's auklets are a diurnal species.

These birds are considered a species of concern in California due to their small or declining population sizes and inherent threats to their unique breeding island habitats.

These species spend most of their time far out at sea, and they breed primarily on offshore islands from Baja California north to the Farallone. Within the SCB, they are most commonly observed well beyond the shelf break, in areas adjacent to submarine canyons and other deep water features, or around the islands on which they breed. These species are not anticipated near the Project site, but could be encountered along the barge transport routes to the sand source sites.

California Brown Pelican. California brown pelicans are large, fish-eating birds commonly seen foraging in the nearshore waters from British Columbia to southwest Mexico. Nesting colonies of brown pelicans are located from the Channel Islands south to the islands off Nayarit, Mexico. While the majority of nesting takes place in Baja California, some occurs on the Channel Islands (Garrett and Dunn 1981, USFWS 2008).

Estimates of the United States (U.S.) breeding population size for the brown pelican were approximately 6,000 pairs in 1991 (Carter et al. 1992). However, in 2006 approximately 11,695 breeding pairs were documented at ten locations throughout the SCB (USFWS 2008). The Chanel Islands are known to support a range of 5,000 to 12,000 nesting pairs during 2004-2006 (NPS 2008a).

A formally listed species, the pelican was delisted in but retains federal protection under the Migratory Bird Treaty Act and is a fully protected species under Section 3511 of the State Fish and Game Code.

<u>Marine Reptiles</u>

Marine Turtles

Though uncommon in the region, four species of marine turtles are known to inhabit the waters off the northeastern Pacific Ocean off the coast of California, all of which are protected under the Federal ESA. They are the green turtle (*Chelonia mydas*), the olive ridley turtle (*Lepidochelys olivacea*), the leatherback turtle (*Dermochelys coriacea*), and the loggerhead turtle (*Caretta caretta*) (Hubbs 1977). The olive ridley turtles are listed as a Federally threatened species, while the populations of leatherback, loggerhead, and green turtles that occur off the California coast are listed as Federally endangered species (Table 3.3-2).

Table 3.3-2. Marine Turtle Species in Southern California Waters

Common Name	Scientific Name	Occurrence in SCB	Likelihood at Site	Protected Status
Green turtle	*Chelonia mydas*	Uncommon	Possible	Federal Threatened. Breeding populations in Mexico are listed as Federal Endangered
Loggerhead turtle	*Caretta caretta*	Uncommon	Possible	Federal Endangered
Olive ridley turtle	*Lepidochelys olivacea*	Uncommon	Possible	Federal Threatened. Breeding populations in Mexico are listed as Federal Endangered
Leatherback turtle	*Dermochelys coriacea*	Uncommon	Unlikely	Federal Endangered

Sources: NOAA 2008, Caretta et al. 2005.

The leatherback is the most frequently encountered turtle off California, followed by the green, loggerhead, and olive ridley sea turtles (Stinson 1984); however, most leatherback sightings are concentrated north of Point Conception. Within the central and southern portions of the SCB, including the Project vicinity, green and loggerhead turtles are the most commonly encountered species. Marine turtles in the SCB generally occur in greatest abundance from July through September.

Protected Marine Reptile Species

Description are provided below for the special status marine reptile species that are reasonably likely to be encountered offshore Broad Beach, near the borrow sites, or along the transit routes between the borrow sites and Broad Beach.

Green Turtle. Green turtles are the most commonly observed marine turtle along the southern California coast. Although there are no nesting beaches on the west coast of the U.S., two permanent colonies of turtles are currently known to exist in the region. One colony of 60 to 100 turtles resides in San Diego Bay, while another group of approximately 30 turtles is now recognized as residing where warm water is discharged into the brackish mouth of the San Gabriel River from a Long Beach power plant (the Los Angeles Department of Water and Power's Haynes Generating Station). Green sea turtles are also occasionally seen elsewhere along the California coast, usually in El Niño years when the ocean temperature is higher than normal.

Loggerhead Turtle. Loggerhead turtles, so named for their relatively large heads, are a cosmopolitan species, found in temperate waters and inhabiting pelagic waters, continental shelves, bays, estuaries, and lagoons worldwide. California sightings of loggerhead turtles generally consist of juveniles that have crossed the Pacific Ocean after hatching on beaches in southern Japan (Stebbins 2003). Sightings off southern California are typically confined to the summer months, peaking from July to September. However, sightings may occur throughout much of the year during El Niño events when ocean temperatures rise.

Olive Ridley Turtle. There should be a description for this species here.

Marine Mammals

Because of its transitional location between the cooler (Oregonian) zoogeographic province to the north of Point Conception and the subtropical (San Diegan) province to that comprises most of southern California's waters, the Project vicinity supports a wide variety of marine mammals. Marine mammals reported within the area are represented by more than 40 species, all of which are protected under the Marine Mammal Protection Act (MMPA). These include 34 species of cetaceans (whales, dolphins and porpoises) and 6 species of pinnipeds (seals and sea lions) (Carretta et al. 2005, Leatherwood et al. 1982 and 1987, Leatherwood and Reeves 1983, and Reeves et al.1992). Additionally, the southern sea otter (*Enhydra lutris nereis*), a representative of the weasel family, Mustelidae, is also found in the region. Six species of cetaceans are federally listed as endangered, while two species of pinnipeds and the southern sea otter are listed as threatened under the Federal ESA.

Marine mammal species in the region can be classified into three categories: (1) migrants that pass through the area on their way to calving or feeding grounds; (2) seasonal visitors that remain for a limited time; and (3) residents that remain much or all of the year. Five whale species transit the Project area during annual migrations, while all but one of the dolphin species have resident populations within the area.

Broad Beach and the proposed sediment sources are located near the geographic middle of the SCB. As such, marine mammal species whose extreme range limit is the SCB, such as the northern fur seal, northern elephant seal, and Steller sea lion, are not likely to be encountered.

Cetaceans

Cetaceans (whales, dolphins, and porpoises) occur in the Project vicinity year-round, although the species present may vary from season to season or from year to year. Cetacean population levels are generally at their lowest in spring and their highest levels during the autumn (Dohl et al. 1983a). The order Cetacea is divided into 2 suborders: mysticetes (baleen whales) (Table 3.3-3) and odontocetes (toothed whales, dolphins, and porpoises) (Table 3.3-4).

A total of 8 species of baleen whales are known to occur in the SCB, with the majority being seasonal visitors or using the coastal waters of the SCB as migratory routes (Carretta et al. 2010, Leatherwood et al. 1982 and 1987, Leatherwood and Reeves 1983). Five species, the California gray whale, humpback whale, blue whale, fin whale (*Balaenoptera physalus*), and minke whale (*Balaenoptera acutorostrata scammoni*) can

Table 3.3-3. Mysticetes (Baleen Whales) of the Southern California Bight

Common Name	Scientific Name	Stock Size	Stock Designation[1]	Regional Habitat	Occurrence in SCB	Likelihood at site	Protected Status
Fin whale	*Balaenoptera physalus*	2,636	COW	Oceanic, coastal and continental shelf	Common, March to October	Possible	Federal and State Endangered; MMPA[2]
Blue whale	*Balaenoptera musculus*	1,744	ENP	Oceanic, coastal and continental shelf	Common, June to November	Possible	
Humpback whale	*Megaptera novaeangliae*	2,043	ENP	Oceanic, coastal and continental shelf	Common, May to November	Possible	
Sei whale	*Balaenoptera borealis*	126	ENP	Oceanic	Rare	Remote	
North Pacific right whale	*Eubalaena japonica*	<100	ENP	Coastal and continental shelf	Rare	Remote	
California gray whale	*Eschrichtius robustus*	18,178	ENP	Coastal and continental shelf	Common, December to May	Likely	MMPA; CA Fish & Game Code[3]
Minke whale	*Balaenoptera acutorostrata scammoni*	478	COW	Coastal and continental shelf	Uncommon	Possible	
Bryde's whale	*Balaenoptera edeni*	12[4]	COW	Oceanic	Rare	Remote	

Source: Carretta et al. 2011.
[1] ENP= Eastern North Pacific; COW = California, Oregon and Washington
[2.] MMPA = Marine Mammal Protection Act
[3] Bryde's whale is known only from E. tropical Pacific stock; however, estimate was derived for the California/Oregon/Washington area by Carretta et al. (2005).
[4] California Fish and Game Code Section 4500

Table 3.3-4. Odontocetes (Toothed Whales, Dolphins, and Porpoises) of the Southern California Bight

<table>
<tr><th>Common Name</th><th>Scientific Name</th><th>Stock Size</th><th>Stock Designation[1]</th><th>Regional Habitat</th><th>Occurrence in SCB</th><th>Likelihood at site</th><th>Protected Status</th></tr>
<tr><td>Sperm whale</td><td>Macrocephalus physeter</td><td>971</td><td>COW</td><td>Oceanic, basins and sea mounts</td><td>Uncommon, generally spring to fall</td><td>Remote</td><td>Federal Endangered; MMPA[2]</td></tr>
<tr><td>Dwarf sperm whale</td><td>Kogia simus</td><td>NA</td><td rowspan="9">COW</td><td rowspan="2">Continental slope to oceanic</td><td rowspan="2">Rare</td><td rowspan="2">Remote</td><td rowspan="9">MMPA;
CA Fish & Game Code[3]</td></tr>
<tr><td>Pygmy sperm whale</td><td>Kogia breviceps</td><td>247</td></tr>
<tr><td>Hubb’s beaked whale</td><td>Mesoplodon carlhubbsi</td><td rowspan="5">1,247</td><td rowspan="5">Continental slope to oceanic</td><td rowspan="5">Rare</td><td rowspan="5">Remote</td></tr>
<tr><td>Blainville’s beaked whale</td><td>Mesoplodon densirostris</td></tr>
<tr><td>Ginkgo-toothed whale</td><td>Mesoplodon ginkgodens</td></tr>
<tr><td>Perrin’s beaked whale</td><td>Mesoplodon perrini</td></tr>
<tr><td>Stejneger’s beaked whale</td><td>Mesoplodon stejnegeri</td></tr>
<tr><td>Baird’s beaked whale</td><td>Berardius bairdii</td><td>228</td><td>Continental slope to oceanic</td><td>Rare</td><td rowspan="2">Remote</td></tr>
<tr><td>Cuvier’s beaked whale</td><td>Ziphius cavirostris</td><td>1,656</td><td>0.25-0.5 nm[4] of shore</td><td>Rare</td></tr>
<tr><td rowspan="3">Killer whale</td><td rowspan="3">Orcinus orca</td><td>84</td><td>Southern Resident</td><td>Coastal</td><td>Rare</td><td>Remote</td><td>Federal Endangered; MMPA</td></tr>
<tr><td>240</td><td>Offshore</td><td>Offshore</td><td>Uncommon</td><td>Remote</td><td rowspan="3">MMPA;
CA Fish & Game Code</td></tr>
<tr><td>451</td><td>Transient</td><td>Coastal</td><td>Uncommon, spring</td><td>Possible</td></tr>
<tr><td>False killer whale</td><td>Pseudorca crassidens</td><td>NA</td><td>NA</td><td>Continental shelf to oceanic</td><td>Rare</td><td>Remote</td></tr>
</table>

Table 3.3-3. Odontocetes (Toothed Whales, Dolphins, and Porpoises) of the Southern California Bight (Continued)

Common Name	Scientific Name	Stock Size	Stock Designation[1]	Regional Habitat	Occurrence in SCB	Likelihood at site	Protected Status
Short-finned pilot whale	*Globicephala macrorhynchus*	304	COW	Offshore islands to oceanic	Rare	Remote	MMPA; CA Fish & Game Code
Risso's dolphin	*Grampus griseus*	16,066	COW	Continental shelf; escarpments	Common year-round	Possible	
Long-beaked common dolphin	*Delphinus capensis*	183,396	California	≤ 50 nm offshore	Common year-round, peak in summer and fall	Likely	
Short-beaked common dolphin	*Delphinus delphis*	449,846	COW	≤ 300 nm offshore	Common year-round with peak in late fall to spring	Possible	
Bottlenose dolphin	*Tursiops truncatus*	323	Coastal California	≤ 0.6 nm of shore	Common year-round	Likely	
		956	Offshore, COW	Offshore		Unlikely	
Pacific white-sided dolphin	*Lagenorhynchus obliquidens*	26,930	COW	Continental shelf	Common, late spring and summer	Possible	
Northern right whale dolphin	*Lissodelphis borealis*	8,334			Uncommon, late winter and spring	Unlikely	
Spotted dolphin	*Stenella attenuata*	NA	None for SCB	Continental shelf to oceanic	Rare	Remote	
Striped dolphin	*Stenella coeruleoalba*						
Long-snouted spinner dolphin	*Stenella longirostris*						

Table 3.3-3. Odontocetes (Toothed Whales, Dolphins, and Porpoises) of the Southern California Bight (Continued)

Common Name	Scientific Name	Stock Size	Stock Designation[1]	Regional Habitat	Occurrence in SCB	Likelihood at site	Protected Status
Rough-toothed dolphin	*Steno bredanensis*						
Dall's porpoise	*Phocoenoides dalli*	99,517	COW	Continental shelf	Common, winter and early spring	Remote	
Harbor porpoise	*Phocoena phocoena*	1,884	Morro Bay	Continental slope to oceanic	Uncommon	Remote	

Sources: Carretta et al. 2005; Angliss et al. 2005; Howorth 1995 and 1998; USGS 2005; NMFS and USFWS 1998a-d; Carretta et al 2011.
[1] ENP= Eastern North Pacific; COW = California, Oregon and Washington
[2] MMPA = Marine Mammal Protection Act
[3] California Fish and Game Code Section 4500
[4] nm = nautical miles

be expected to occur within the Project vicinity (Dohl et al. 1983a, Carretta et al. 2006) (Table 3.3-3). The remaining three whale species are only rarely sighted in the SCB, or are generally found far offshore. Five of the whales are considered endangered under the Federal ESA and the California ESA. These listings were largely in response to worldwide population declines from intensive commercial whaling.

Odontocetes species in the SCB include 21 species, 6 of which are known to commonly occur in the SCB while the other fifteen species are rare or uncommon. Commonly occurring species include both species of common dolphin (long-beaked and short-beaked), the bottlenose dolphin, Risso's dolphin, and the pacific white-sided dolphin. The sperm whale and southern resident killer whale are both considered endangered under the Federal ESA; however, these species have a remote likelihood of occurring at the Project site. The transient killer whale, on the other hand, has the potential to occur in the project site, but is not listed as endangered. Tables 3.3-3 and 3.3-4 summarize the cetacean species known to occur in the SCB. For each species, these tables include the common name and scientific name, stock designation, population or stock size estimate, and protection status. Additionally, the tables contain the species' habitat preference, occurrence, and seasonality in the SCB, and their potential for occurrence near the Project site.

Pinnipeds and Fissipeds

Six pinniped species and one fissiped species, the southern sea otter, have historically been found offshore southern California (Table 3.3-5). Four of the species are year-round residents in the SCB, while the remaining two are uncommon visitors but have previously maintained substantial populations within the region (CINMS 2005). Only two of the pinniped species, the California sea lion (*Zalophus californianus*) and the harbor seal (*Phoca vitulina*), are expected to be encountered in the immediate vicinity of the Project sites with any regularity, although the resident populations of California sea lions, northern fur seals, and northern elephant seals all maintain breeding colonies on San Miguel Island, the northernmost of the Channel Islands. A discussion of California sea lion and harbor seal are included below in Protected Marine Mammal Species, and a discussion of the remaining pinnipeds and fissipeds is included in Appendix D.

Table 3.3-5. Pinnipeds and Fissipeds of the Southern California Bight

Common Name	Species Name	Occurrence in SCB	Likelihood at Site	Protected Status
California sea lion	*Zalophus californianus*	Year-round resident	Likely	MMPA[1] & CA Fish & Game Code[2]
Harbor seal	*Phoca vitulina*		Likely	
Northern fur seal	*Callorhinus ursinus*		Remote	
Northern elephant seal	*Mirounga angustirostris*		Remote	State Fully Protected [3]
Steller (Northern) sea lion	*Eumetopias jubatus*	Rare visitor	Remote	Federal Threatened
Guadalupe (Southern) fur seal	*Arctocephalus townsendi*	Occasional visitor	Unlikely	Federal and State Threatened; State Fully Protected
Southern sea otter	*Enhydra lutris nereis*	Year-round resident	Unlikely	Federal Threatened; State Fully Protected

Sources: Adapted from Bonnell and Dailey 1993, and Carretta et al. 2011.
[1] MMPA = Marine Mammal Protection Act
[2] Fish and Game Code Section 4500
[3] The classification of Fully Protected was California's initial effort in the 1960s to identify and provide additional protection to those animals that were rare or faced possible extinction.

Protected Marine Mammal Species

Description are provided below for the marine mammal species that are protected under state and/or federal law and are reasonably likely to be encountered offshore Broad Beach, near the borrow sites, or along the transit routes between the borrow sites and Broad Beach.

Blue and Humpback Whales. The blue whale population off the California coast consists of approximately 2,497 individuals with the Eastern North Pacific population of humpbacks estimated at approximately 2,043 individuals (Carretta et al. 2010, 2011). Both whale species are listed as endangered under the Federal ESA, and are considered strategic and depleted under the MMPA. It is estimated that approximately 36 humpback whales occur off Southern California in the waters south of Point Conception (Barlow and Forney 2007). Both blue whales and humpbacks are frequently spotted by shoreline observers from the bluffs of the Palos Verdes Peninsula.

In the SCB, Blue and humpback whales generally utilized the SCB from late May through October, remaining through the summer before heading north, to the waters off central or northern California. The whales generally leave California by November, although specimens are occasionally reported throughout the year (Larkman and Veit 1998, Calambokidis 2000). The stock of both species spend winter in the waters off Central America and Mexico, where they breed and calve.

Fin Whale. Fin whales are the world's second-largest mammals behind blue whales, and are present year-round in southern California, with most sightings in the SCB occurring in summer and early fall (Forney et al. 1995). The best available abundance estimate of fin whales in California, Oregon, and Washington waters is currently 3,044, although this likely underestimates the true population size (Carretta et al. 2011). Additionally, fin whale abundance in the California Current area appears to have increased over the past 20 years, and is expected to continue this trend over the next decade (Moore and Barlow 2011).

Fin whales are commonly observed in the San Pedro Channel by whale watchers from atop the Palos Verdes Peninsula. They are also frequently spotted south of the Project vicinity, near San Clemente Island. Aerial surveys conducted off southern California in the fall of 2008 resulted in sightings of 22 fin whales (Oleson and Hill 2009; Acevedo-Gutiérrez et al. 2002).

Fin whales are highly susceptible to ship strikes. In April 2009, a 60-foot fin whale was struck and killed by a 900-foot container ship transiting between the Santa Barbara Channel and San Pedro Bay, though the exact location of the strike is unknown. It was the third fin whale mortality within the SCB from a known ship strike in less than 1 year.

Minke Whale. Minke whales are the smallest of the baleen whales found in North American waters. Offshore of southern California, these baleen whales are usually sighted individually or in small groups of two to three. Minke whales generally occupy waters over the continental shelf, including inshore bays, and even occasionally enter estuaries. They are present in Southern California during the summer and fall (Carretta, Forney, Lowry, et al. 2009).

Minke whales in the coastal waters of California, Oregon, and Washington (including Puget Sound) appear behaviorally distinct from whales further north and those in Hawaii, and are considered as a separate stock by the NMFS (Carretta, Forney, Lowry, et al. 2010). Unlike in other areas, Minke whales along the California coast do not migrate, but maintain home ranges. The population of Minke whales off California, Oregon, and Washington is currently estimated at around 478 individuals. Small numbers of these whales are sighted each year during the annual gray whale migration counts performed by the American Cetacean Society from the bluffs of the Palos Verdes Peninsula.

California Gray Whale. The California gray whale is the most common baleen whale to occur in the Project vicinity. Gray whales primarily occur in shallow waters over the continental shelf and are considered to be one of the most coastal of the great whales (Jefferson et al. 2008; Jones and Swartz 2009).

Gray whales are generally slow-moving animals, and were heavily impacted by commercial whaling through the first half of the 20^{th} century (Jefferson et al. 2008). In 1994, following the recovery of the stock with the cessation of commercial whaling, the Eastern North Pacific population of gray whales was removed from the Federal endangered species list. The population grew to an estimated high of approximately 26,000 individuals in 2000. Since then, the population has subsided somewhat, and currently consists of approximately 17,000 to 20,000 individuals (Rugh, Muto, et al. 2008; Swartz et al. 2006).

Almost the entire population of gray whales passes through the Project vicinity twice each year during this annual migration, which takes approximately 2 months each way. Although small numbers of gray whales have been reported traveling southbound through the SCB as early as October and November, the bulk of the southbound migration in this region does not begin in earnest until late December and generally continues through February. By mid-February however, some whales are already beginning to return on their northbound trip. Point Dume, just south of the Project area, is a popular location from which to view the gray whale migration. It is therefore expected that gray whales will appear sporadically near the Project site, particularly during the spring months when they are migrating northward.

Gray whale migration corridors generally follow the mainland coast for much of the way. However, they diverge south of Point Conception, with one track extending along the north side of the northern Channel Islands and branching through the islands, and others following the coast through the Santa Barbara Channel. In general, southbound whales stay farther offshore, while the northbound whales follow the coastline more closely (Herzing and Mate 1984, Reilly 1984, Rice et al. 1984, Rugh 1984, Dohl et al. 1983a, Sund and O'Connor 1974). The northbound migration generally peaks in March, but continues into May. Mothers with calves are usually the last to depart on the journey north (Leatherwood et al. 1982 and 1987, Leatherwood and Reeves 1983).

Although gray whales generally fast during the migration and calving season, they may stop to feed opportunistically in or near the calving lagoons or in the shallow coastal waters along the migration route, particularly during their northbound journey (Jones and Swartz 2008). Whales have been observed throughout the SCB feeding on amphipods in giant kelp beds, sand crabs (*Emerita analoga*) along the surf line, and on krill farther offshore (Anderson 1995, Howorth 1965-2006). However, most gray whales do not linger long in the region, but continue their journey to northern feeding grounds.

Common and Bottlenose Dolphins. Three dolphin species are the most common cetaceans found in the region. The two species of common dolphin (*Delphinus delphis and D. capensis*) account for 57 to 84 percent of the total seasonal cetacean population in the SCB (Dohl et al. 1981). These animals feed mostly on small schooling fishes and squid. Common dolphins off southern California have been documented to feed mostly at night, on prey linked to the deep scattering layer (DSL), which migrates toward the surface at night.

Bottlenose dolphins are also extremely common in the Project vicinity, particularly in inshore (<0.3 mile) waters, where they may compromise more than 80 percent of cetacean sightings. Bottlenose dolphins along the California coast are commonly found in groups of 2 to 15 individuals and use echolocation to locate and capture prey such as benthic invertebrates and fish. Offshore, they may form herds of several hundred individuals.

Killer Whale. Killer whales, the largest members of the dolphin family, are among the most easily recognized of the odontocetes in the SCB. They are highly social animals that typically travel in matrilineal family groups (pods) of up to 50 individuals, although most pods are much smaller. They favor sub-temperate to cold temperate waters.

Three stocks of killer whales have been documented off the coast of California, which are distinguished by their social behavior, physical appearance, preferred food, and vocal dialects (NOAA and NMFS 1999b and c, Carretta, Forney, Lowry et al. 2010, Hoelzel et al. 2007). They are referred to as the “offshore”, “resident”, and “transient” stocks.

The transient stock ranges from southern California to as far north as Alaska and eastern Russia and is the only one of the three stocks reasonably expected to be encountered in the Project vicinity. Currently, the best available abundance estimate for the eastern north Pacific transient stock is 451 individuals (Carretta et al. 2011). Population trends in California are not known at this time, although sightings of increasingly large pods of transient orcas are being reported more often, particularly during the northbound gray whale migrations (Connally 2005).

Throughout the 1980s a small pod frequented the area commonly enough to earn the moniker ‘L.A. pod’ for its proximity to Los Angeles. Recently, however, the killer whale group known as the CA-51s has been frequenting the Santa Monica Bay area. This family group, which consists of seven individuals, has been seen seven times in the area since September 2011. They are known as “the friendly seven,” because of their interactions with boaters.

Killer whales feed on a variety of prey, including bony fishes, elasmobranchs, cephalopods, seabirds, sea turtles, and other marine mammals (Fertl et al. 1996; Jefferson et al. 2008). Some populations are known to specialize in specific types of prey; transients mainly prey on other marine mammals (Jefferson et al. 2008; Krahn et al. 2004; Wade et al. 2009). Transient killer whales in the region have been observed feeding on gray whales, Pacific harbor seals, California sea lions, and fish along the mainland coast (Howorth 1965-2006; Sussman 1988).

Other Dolphins and Porpoises. Other delphinids that may be encountered at the Project site include the Pacific white-sided dolphin (*Lagenorhynchus obliquidens*) and Risso's dolphin (*Grampus griseus*). These species vary in their patterns of usage of the area and periods of peak abundances (Dohl et al. 1983a). The Pacific white-sided dolphin is common in late spring and summer, and uncommon in late winter and spring. Risso's dolphins (*Grampus griseus*) are commonly seen near the Channel Islands and are relatively abundant in the SCB when warm currents dominate.

California Sea Lion and Harbor Seal. California sea lions are the most abundant pinnipeds offshore southern California and are the most commonly sighted pinniped in the Project vicinity. California sea lions maintain rookeries on the offshore islands, including San Miguel Island, and frequently rest on nearshore rocks and navigation buoys. Harbor seals are also very common along the southern California coast and may come into bays and harbors, but do not exhibit the overt social behavior of sea lions. Along the outer coast both species haul out on offshore rocks or may rest on sand bars at low tide. Unlike the wider-ranging sea lions, however, harbor seals forage relatively close to shore, with 75 percent remaining within 6.2 miles of the shoreline (MMS 2001). Harbor seal rookeries are mostly located in central and northern California, with the nearest established rookeries located on the Channel Islands, at Carpinteria, and near San Diego.

3.3.1.4 Seafloor Habitats and Biota

As discussed in Section 3.2, *Marine Water and Sediment Quality*, most of the deep seafloor within Santa Monica Bay consists of unconsolidated (soft) sediments (various mixtures of sand, silt, and clay) overlying a moderately sloping bottom, while the nearshore areas consist of sandy and soft-bottom sediments. Cobble and gravel substrates are restricted to the innermost shelf south of El Segundo and limited parts of the shelf edge. Patches of sand and gravel are interspersed with rocky substrates on the high-relief marginal plateau and along parts of the shelf break just offshore Malibu (Edwards et al. 2003). Limited regions of hard-bottom substrate and kelp beds exist at the periphery of Santa Monica Bay, including near the Project area at Lechuza Point (Allen 1982, Terry et al. 1956) (Figure 3.3-2). As a routinely dredged site, the seafloor at Ventura Harbor contains habitat of minimal value.

Figure 3.3-2. Shoreline Habitats near the Project Site

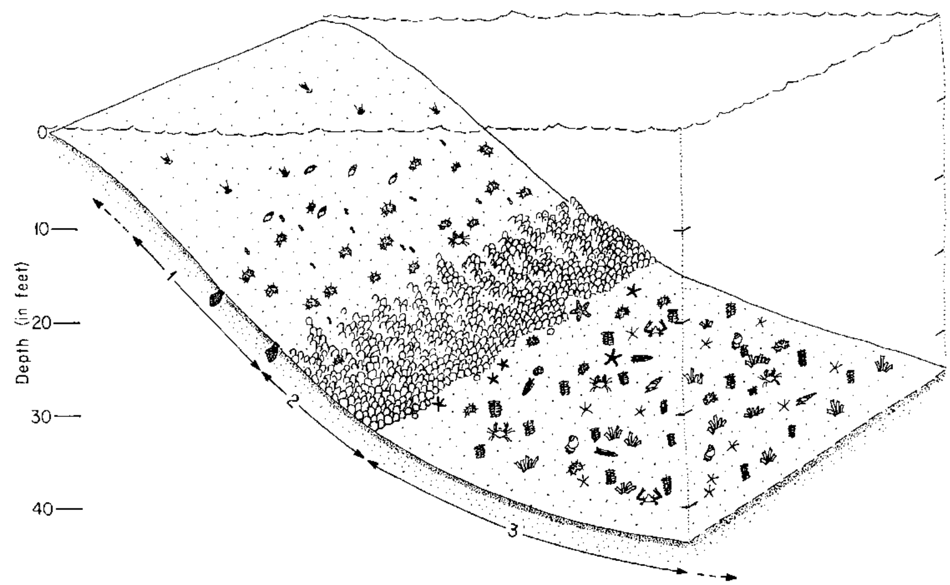
<u>Soft-bottom Habitats</u>

The soft-bottom habitat of the region supports a diverse and abundant infauna (animals that live in the substrate), with as many as 1,200 infaunal species having been reported from Santa Monica Bay (Dorsey 1988). The abundance and distribution of infauna varies seasonally and interannually; however, infauna in the Project area and at the proposed dredging sites are usually dominated, in both number of species and individuals, by polychaete worms. Other important infaunal groups in the region include crustaceans, mollusks, and echinoderms (Phylum Echinodermata).

Most polychaetes either feed on the bottom by engulfing sediments and digesting the attached bacteria, filter feed on bits of organic detritus in the water, or prey on other infauna (Morris et al. 1980). For example, the blood worm (*Glycera dibranchiata*) is an infaunal polychaete that feeds on bacteria, microalgae, and smaller invertebrates beneath the sand. Polychaetes play an important role in reworking the sediments and are important constituents in the diet of many demersal fish.

Epibenthic (living on the bottom) invertebrates of the Bay include sea stars, sea cucumbers, sand dollars (*Dendraster excentricus*), sea urchins, crabs, snails, and sea slugs. These organisms are larger than infaunal species, generally less common and, therefore, spaced further apart. However, sand dollars and sea urchins often occur in very dense, single-species patches that limit the abundance of other species. Historically, the area offshore Zuma Beach east of the Project area, has supported nearshore populations of sand dollar beds, Pismo clam beds and a biological zonation of the supporting habitat that varies with both depth and wave action (Figure 3.3-3; Morin et al*.* 1985, 1988).

Figure 3.3-3.
Biological Zonation of Nearshore Sandy Bottom Habitat near Broad Beach



Species	Zone
Spiny Sand Crab (Blepharipoda occidentalis)	1
Purple Olive Snail (Olivella biplicata)	1
Pismo Clam (Tivela stultorum) [side view]	1
Pismo Clam (Tivela stultorum) [surface view]	1
Sea Pansy (Renilla kollikeri)	1,3
Purple Crab (Cancer gracilis)	1-3
Sand Dollars (Dendraster excentricus)	2
Pink Star (Pisaster brevispinas)	2
Shallow Sand Star (Astropecten armatus)	2,3
Deep Sand Star (Astropecten verrilli)	3
Carpenter's Turrid (Megasurcula carpenteriana)	3
High Moon Snail (Polinices altus)	3
Pansy Nudibranch (Armina californica)	3
Sea Pen (Stylatula elongata)	3
Gray Tube Worm (Diopatra ornata)	3
Elbow Crab (Hetero crypta occidentalis)	3

During a subtidal survey of Broad Beach conducted by Chambers Group in 2010, sand dollar beds were observed at depths of between 10 and 14 feet along the eastern half of the site. Other characteristic organisms observed in this sand bottom habitat were tube worms (*Diopatra ornata*), sea pens (*Stylatula elongate*), sea pansies (*Renilla kollikeri*) and several species of crabs (*Cancer gracilis, Randallia ornata,* and *Heterocrypta occidentalis*).

Bivalves in the region include the aforementioned Pismo clams (*Tivela stultorum*), along with Pacific littleneck clams (*Leukoma staminea*), and Gould bean clams (*Donax gouldi*). Pismo clams have occurred historically in the shallow sand bottom habitats off the eastern end of Broad Beach and are most common at depths of 10 to 20 feet, while the Pacific littleneck clam, is found in coarse sand and gravel near rocky areas (Morin and Harrington 1978, Blunt 1980). Pismo clams are an important invertebrate species that once supported a significant commercial fishery, along with an extremely popular recreational fishery that still exists today.

Primarily as a result of overharvesting and habitat degradation, declines in abundance have occurred in all three clam species (Shaw and Hassler 1989, Chew and Ma 1987, DFG 2006). Although no live Pismo clams were observed during the 2010 field survey conducted at Broad Beach by Chambers Group (Chambers Group 2010), empty shells were observed suggesting that this species may still be present in the area.

The most obvious sandy intertidal crustacean in the area is the sand crab (*Emerita analoga*), which is collected commercially for fishing bait and is also an important food source for fishes that live in the surf zone. Individuals of this species burrow in the wave swash zone of high-energy sandy beaches where they often occur in dense aggregations (many thousands per square yard). Sand crabs are prey for a number of shorebirds and several species of fish including California corbina (*Menticirrhus undulatus*), barred surfperch (*Amphisticus argenteus*), and black croaker (*Cheilotrema saturnum*).

Most of the variability in infaunal populations is natural and is difficult to separate from variability associated with human impacts (Reish 1980, Bernstein et al. 1984). However, any disturbance of the sediments or oceanographic change is likely to affect benthic soft-bottom invertebrate populations. For example, severe storms during the El Niño period in 1983 may have been responsible for changes in the invertebrate assemblage of the SCB (SCCWRP 1986), including areas off the Palos Verdes Peninsula (Swartz et al. 1986).

Two of the potential sand source sites for the Project, Dockweiler and Central Trancas, are comprised of sandy bottom habitats. The Central Trancas Site lies at a depth of 50 to 55 feet, approximately 10 feet deeper than the Dockweiler Site, which lies in 45 feet of water. During the 2010 reconnaissance survey, no sensitive habitats were observed at either of these two sites. The benthic organisms observed at both sites were typical of southern California sand bottom habitats (Morin et al. 1988, Davis and VanBlaricom 1978, Thompson et al. 1993).

Table 3.3-6 lists the organisms observed at the Dockweiler and Trancas sites during subtidal surveys conducted in 2010. Frequently observed animals on the Dockweiler

1 **Table 3.3-6. Organisms Observed at Dockweiler and Trancas Sand Source Sites**

Common Name	Scientific Name	Presence	
		Dockweiler	Central Trancas
Phaeophyta			
Giant kelp	*Macrocystis pyrifera*		X
Palm kelp	*Ptyregophora californica*		X
Cnidaria			
Sand anemone	*Harenactis attenuata*	X	
Slender sea pen	*Stylatula elongata*	X	X
California sea pen	*Virgularia californica*	X	X
Mollusca			
Spanish shawl	*Flabellinopsis iodinia*	X	
Kellet's whelk	*Kelletia kelleti*	X	X
Carpenter's turrid	*Megasurcula carpenteriana*	X	
San Pedro auger	*Terebra pedroana*	X	X
Cooper's nutmeg	*Cancellaria cooperi*		X
Annelida			
Ornate tube worm	*Diopatra ornata*	X	X
Polychaete worm	*Pista pacifica*	X	
Arthropoda			
Brown rock crab	*Cancer antennarius*	X	
Slender crab	*Metacarcinus gracilis*	X	X
Mantis shrimp	*Hemisquilla ensigera*	X	X
California spiny lobster	*Panulirus interruptus*	X	
Southern kelp crab	*Taliepus nuttalli*	X	
Masking crab	*Loxorhynchus crispatus*		X
Echinodermata			
Spiny sand star	*Astropecten armatus*	X	
Long-armed brittle star	*Amphiodia occidentalis*		X
California sand star	*Astropecten verrilli*		X
Short-spined sea star	*Pisaster brevispinus*		X
Giant sea star	*Pisaster giganteus*		X
Bryozoa			
Bryozoan	*Thalamoporella californica*	X	X
Vertebrata			
Speckled sanddab	*Citharichthys stigmaeus*	X	X
Turbot	*Pleuronichthys* sp.	X	
Lizard fish	*Synodus lucioceps*	X	
Pipefish	*Syngnathus sp.*	X	X
California sea lion	*Zalophus californianus*	X	

transects included the ornamental tube worm, sand stars (*Astropecten armatus)*, slender crabs (*Cancer gracilis)*, sea pens*,* and mantis shrimp (*Hemisquilla ensigera).* Large numbers (as many as 20 per dive) of California spiny lobster (*Panulirus interruptus*) were also observed along the transects at this site.

Although spiny lobsters usually are found in rocky habitat, where they take shelter in holes and crevices, a large portion of the population migrates annually in response to changes in water temperature. During winter months, lobsters are typically found offshore at depths of 50 feet or more; however, in spring, lobsters move into warmer onshore waters of less than 30 feet in depth. The higher temperatures in the nearshore waters shorten the development time for lobster eggs. Nearshore waters also have a more plentiful supply of food. Lobsters move back offshore during fall and early winter in response to storms that cause increased wave action in shallow water

The Central Trancas borrow area supports a more abundant and diverse benthic invertebrate community than the Dockweiler Site. Deeper subtidal sand bottom communities are subjected to less disturbance by wave action and the associated bottom surge and sand movement than shallower communities, and typically support a more diverse and abundant infaunal community.

Common organisms at the Trancas site included the tube worm*,* the slender cancer crab*,* and the speckled sanddab (*Citharichthys stigmaeus)*. Four or five juvenile individuals of the giant kelp (*Macrocystis pyrifera)* were observed growing on tubes of the worm (*D. ornata)*.

<u>Hard-bottom Habitats</u>

Hard-bottom habitats host a diverse and abundant assemblage of organisms that are often unique to their habitat (MBC 1993). These areas provide substrate suitable for attachment of a variety of plants and sessile (immobile) invertebrates, as well as shelter and forage for more motile organisms (organisms that move spontaneously and actively, consuming energy in the process). Sessile species utilizing hard-bottom substrate include mussels, rock scallops (Family Pectinidae), barnacles, sponges, sea anenomes, sea fans (Order Gorgonacea), feather duster worms (Family Serpulidae), wormsnails (Family Vermetidae), and sea squirts (Order Ascidiacea). Most of these sessile invertebrates feed by filtering plankton and detritus from the water column. Motile invertebrates, including crabs, octopuses, and shrimp hide in crevices or are protectively colored. Invertebrates associated with hard bottom substrates are frequently a food source for birds (in the exposed intertidal zone) and fish (in the subtidal zone).

Within the western portions of the Project area at Broad Beach, shallow water rocks and reefs, which are the most likely to be affected by beach sand, occur from the intertidal zone to about 15 feet water depth. These low reefs and isolated boulders are close to shore and are strongly affected by swell, longshore currents, sanding in, high turbidity and scour, by local runoff from the land, and even by lowered salinity from rain storms (Morin and Harrington 1978). Biological communities on these shallow rocks are often characterized by rapid turnover of species. Long-lived, sand-tolerant species typical of nearshore rocks at this depth include aggregate anemones, surfgrass, feather boa kelp and California mussels.

Nearshore reefs at depths between 15 feet and 30 feet represent a transition between shallow water reefs and offshore reefs. The most prominent species on the tops of these reefs tend to be the shrub-like intermediate-height brown kelps such as sea palms (*Eisenia arborea* and *Pterygophora californica*) and bladder kelp (*Cystoseira osmundacea*). The sides of the reefs generally support a rich encrusting fauna of sponges, tunicates and bryozoans. Giant kelp also occurs on these nearshore reefs, and sea urchins (*Strongylocentrotus purpuratus* and *S. franciscaus*) may be abundant.

Nearshore reefs also provide substrate for giant kelp (*Macrocystis pyrifera*), feather boa kelp (*Egregia menziesii*), and palm kelp (*Pterogophora californica*), which provide additional habitat for a multitude of organisms. Since most hard bottom habitats in the Project area are of low relief, the presence of kelp often lends a vertical element to the habitat that is otherwise lacking. A shallow subtidal survey was conducted within the Project area at Broad Beach, which identified surfgrass, eelgrass (*Zostera pacifica*), giant kelp (*Macrocystis pyrifera*), feather boa kelp (*Egregia menziesii*), southern palm kelp (*Eisenia arborea*), palm kelp (*Pterygophora californica*), and gorgonians (*Muricea californica* and *M. fruticosa*). These species are considered indicator species because they add important structure to the environment and increase the value of the habitat when they are present (Chambers Group 2012).

Because rocky reefs are diverse and have an abundance of unique organisms, they are typically important sites for recreational diving and fishing; California spiny lobster (*Panulirus interruptus*), yellow and Pacific rock crabs (*Cancer* spp.), red and purple sea urchins (*Strongylocentrotus franciscanus* and *S. purpuratus*, respectively), and spot shrimp/prawn (*Pandalus platyceros*) are fished recreationally in the Project region (MBC 1993). Abalone was also fished both recreationally and commercially in the area until the 1990s.

Over hard-bottom substrates, fish assemblages generally differ in composition relative to depth. Common shallow-water families include sea basses (Family Serranidae), surfperches, rockfishes, kelpfishes (Family Clinidae), sculpins, damselfishes (Family Pomacentridae), and wrasses (Family Labridae). In deeper waters, vermilion rockfish, bocaccio, cowcod (*Sebastes levis*), and flag rockfish (*Sebastes rubrivinctus*) dominate (Allen et al. 1976, Moore and Mearns 1980).

Kelp Beds

Rocky subtidal habitats in the Project vicinity, and throughout much of the SCB, are vegetated with a wide variety of red and brown algae (MBC 1993). Red algae generally form a low turf or understory of coralline, foliose, and filamentous forms from shore to the edge of the photic zone. Brown algae are generally larger and form an overstory; locally, feather-boa kelp is dominant nearshore, while giant kelp dominates deeper areas of reefs, forming large beds at depths of 20 to 120 feet (CDFG 2001, Quast 1968a).

Giant kelp is a large, fast-growing, perennial algae that thrives in protected nearshore waters from Baja California to Santa Cruz (Druehl 1970). Kelp usually attaches to rock outcrops or large cobbles to stay in place; however, under calm conditions kelp plants have occasionally established themselves successfully in sandy subtidal regions as well, generally by attaching themselves to worm tubes (North 1971, Chambers 1991).

Giant kelp beds form an important and distinct marine habitat along the rocky coastal reaches of the SCB, particularly within the nearshore waters of the Channel Islands. The rocky bottoms found offshore Leo Carrillo State Beach, the Malibu coast, and along the Palos Verdes Shelf support the majority of the kelp stands within the Santa Monica Bay, although individual plants occasionally manage to gain a foothold on temporarily exposed rocks along the sandy, central portions of the Bay as well (MBC 1993).

Giant kelp beds create a vertically structured habitat that extends from the seafloor up to the sea surface, providing food, shelter, and nursery areas for a variety of invertebrates and fishes. Kelp bass, black perch, rubberlip seaperch, opaleye, kelp rockfish, and olive rockfish (*Sebastes serranoides*) are all commonly encountered in kelp beds. Topsmelt, kelp pipefish (*Syngnathus californiensis*), kelp perch (*Brachyistius frenatus*), giant kelpfish (*Heterostichus rostratus*), kelp clingfish (*Rimicola muscarum*), and kelp gunnel (*Apodichthys* [=*Ulvicola*] *sanctaerosae*) are fishes known to frequent the canopy, or upper reaches of the kelp forest (MBC 1993). Lower down in the water column, where the leafy canopy is not as dense, yellowtail, white sea bass (*Atractoscion* [=*Cynoscion*] *nobilis*), rubberlip seaperch, halfmoon (*Medialuna californiensis*), and halfblind goby (*Lethops connectens*) can be found. Several of these species are important commercial and recreational fishery species. Giant kelp has historically been harvested commercially within the region for a variety of purposes.

Seagrass Beds

Seagrass beds are regarded worldwide as some of the most productive of marine habitats. Not only do these beds act as protective nursery grounds for many finfish and shellfish, but they also act as substrate for epiphytic algae and micro-invertebrates, and serve as an important food source for waterbirds.

Two types of seagrass are found along the southern California coast - surfgrass and eelgrass. Although these two plants look similar superficially, they are adapted for very different types of habitat. Surfgrass generally grows on rocky substrates and is found in high-energy near-shore environments, such as tidepools and the surf zone. Meanwhile, wider-bladed eelgrass typically grows in sandy, sheltered areas, where there is adequate protection from waves and storms. Seagrasses are utilized in studies as a marker of the upper limit of the lower tidal zone, and for their sensitivity to pollution. They are also important for sediment deposition and substrate stabilization.

A substantial Pacific eelgrass bed (*Zostera pacifica*) occurs offshore Broad Beach at depths of approximately 24 to 47 feet (Moffatt & Nichol 2012) (Figure 3.3-4). Additionally, a 2010 reconnaissance survey of marine biological resources at Broad Beach (Chambers Group 2010) confirmed the presence of surfgrass (*Phyllospadix* spp.) at the west end of the project site, primarily off Point Lechuza, which becomes more scattered and patchy as one progresses along the beach to the east.

Pacific eelgrass has long, bright green, ribbon-like leaves, with short stems that grow up from extensive, branching rhizomes. It grows submerged or partially floating in the marine environment and reproduces through rhizome growth and seed germination. It is found in estuaries and along protected coastlines, where it grows on muddy and sandy bottoms, from the low intertidal to a depth of approximately 66 feet, Eelgrass beds grow rapidly in the spring and summer, then decay in the fall and winter. Dead eelgrass blades often wash up on the beach where their decay adds crucial nutrients to coastal environments.

Surfgrasses (*Phyllospadix* sp.) grow in large clumps or beds exposed during low tide and submerged at high tide and are found attached to rocks in the middle to low intertidal zones to a depth of about 40 to 50 feet. The bright green leaves of surfgrass are typically narrow (0.04 to 0.15 inch), but can range up to 10 feet in length depending on the species. Surfgrasses bloom in late fall, then release tiny seeds shaped like horseshoes with sharp, barbed ends that can latch onto the branches of coralline red algae, anchoring the young seedlings against winter storm waves. Surfgrass seeds typically sprout between January and March, with the plants growing rapidly once sunlight and nutrients become plentiful.

<u>Marine Invertebrates</u>

Abalone

Abalone are large marine snails associated with rocky intertidal and subtidal areas where they cling to rocks, feeding on kelp and other algae that they scrape off the substrate. For a time during the 1970s to 1990s, they comprised a highly valuable fishery in southern California. Surveys of the Broad Beach intertidal and subtidal areas and the proposed off-shore dredge sites did not indicate the presence of any abalone species (Chambers 2011, 2012). Of the seven abalone species historically found in the waters along the southern California coast near the Project sites, two are currently listed as Federally endangered and two are currently recognized as Federal species of concern (Table 3.3-7). The primary factors contributing to the decline of these species are over-harvesting, illegal harvesting and trade, predation, disease, and El Niño events. Illegal poaching and disease, and reproductive constraints currently constitute the biggest threats to the continued survival and recovery of these species. None of these species are likely to occur in the Project area.

Table 3.3-7. Abalone Species of Southern California

Common Name	Species Name	Likelihood at Site	Protected Status	Preferred Depth[1]
Black Abalone[2]	*Haliotis cracheirodii*	Unlikely	Federal Endangered	Intertidal to 20 ft
Green Abalone	*Haliotis fulgens*	Unlikely	Species of Concern[3]	Intertidal to ≥30 ft
Pink Abalone	*Haliotis corrugate*	Unlikely	Species of Concern	20 ft to ≥120 ft
White Abalone	*Haliotis sorenseni*	Unlikely	Federal Endangered	Subtidal to ≥200 ft
Red Abalone	*Haliotis refescens*	Unlikely	None	Subtidal to ≥100 ft
Threaded Abalone	*Haliotis assimilis*	Unlikely	None	20 ft to ≥80 ft
Flat Abalone[2]	*Haliotis walallensis*	Unlikely	None	20 ft to ≥70 ft

[1] ft = feet
[2] Flat and Black abalone are no longer found south of Point Conception (Owen 2006, NMFS 2011).
[3] Federal species of concern

3.3.1.5 Shoreline Habitats and Biota

Rocky intertidal (shoreline) habitats are generally limited to the extreme northern (Malibu) and southern (Palos Verdes Peninsula) portions of the Santa Monica Bay. The western end of Broad Beach is bounded by the rocky headland of Lechuza Point (Figure 3.3-4), and to the east the promontory of Point Dume also contains rocky shoreline habitat. Low relief areas of rocky substrate and cobble also occur in several patches throughout the western portion of Broad Beach. However, these lower relief areas are intermittently covered by sand. As discussed previously, Broad Beach is subject to substantial fluctuations in sand levels. These fluctuations occur on both a seasonal as well as multi-year basis. The higher relief intertidal community at Lechuza Point is also characteristic of a sand-influenced site with intermittent emergent rock (Raimondi et al. 2012).

Figure 3.3-4. Rocky Substrate and Sensitive Habitat Areas on Western Portions of Broad Beach

Rocky intertidal habitats contain diverse assemblages of algae, invertebrates, and fish. The diversity of algae and invertebrate species in these habitats tends to increase from high to low elevations. Most intertidal species vary with tidal elevation, restricted by their ability to withstand desiccation, competition, and predation (Doty 1971, MBC 1992a). Additionally, in areas subjected to heavy wave action, the lower intertidal zone may be expanded upwards and the upper intertidal zone restricted (Ricketts and Calvin 1968).

Plants in the rocky intertidal habitats typically display vertical zonation, with distinct species assemblages at different tidal levels, although the patterns may be disrupted by grazing by marine animals. Lichens dominate the splash zone (highest zone), whereas the upper intertidal (below the splash zone) flora includes green algae (Subphylum Chlorophyta) such as sea felt (*Enteromorpha* spp.) and sea lettuce (*Ulva* spp.), brown algae (Subphylum Phaeophyta) such as rockweeds (*Selvetia* spp.), and various red algae (Subphylum Rhodophyta). The middle intertidal includes a more diverse algal assemblage with red and brown algae. The lower intertidal consists of red and brown algae as well as surfgrass (*Phyllospadix* spp.) (Hedgepeth and Hinton 1961, Dawson 1966).

Table 3.3-8 lists the marine organisms present in the rocky intertidal habitats. Invertebrates that live in the highest intertidal zones are typically shelled species able to tolerate exposure to the air for long periods of time. In the upper intertidal zone, species diversity increases. The middle intertidal is marked by filter feeders and deposit feeders. The lower intertidal is similar to the rocky subtidal, with abundant invertebrates (Hedgepeth and Hinton 1961).

Table 3.3-8. Organisms in Rocky Intertidal Habitat

Common Name	Classification	Common Name	Classification
High Intertidal Zone		**Upper Intertidal Zone**	
periwinkles	*Littorina* spp.	snails	Class Gastropoda
barnacles	*Balanus* and *Chthamalus* spp.	bivalves (attached)	Class Bivalvia
limpets	Family Acmaeidae	chitons	Class Polyplacophora
rock lice	*Ligia* spp.	hermit crabs	Tribe Paguridea
		striped shore crabs	*Pachygrapsus crassipes*
Middle Intertidal Zone		**Lower Intertidal Zone**	
California mussels	*Mytilus californianus*	sponges	Class Demospongiae
gooseneck barnacles	*Lepas* spp.	sea anemones	Order Actiniaria
sea anemones	Order Actiniaria	snails	Class Gastropoda
snails	Class Gastropoda	sea slugs	Class Opisthobranchia
sea slugs	Class Opisthobranchia	bivalves (attached)	Class Bivalvia
octopus	*Octopus* spp.	octopus	*Octopus* spp.
polychaetes	Class Polychaeta	bryozoans	Phylum Ectoprocta
barnacles	*Balanus* and *Chthamalus* spp.	amphipods	Order Ampipoda
isopods	Order Decapoda	isopods	Order Decapoda
crabs	Order Decapoda	shrimp	Order Decapoda
shrimp	Order Decapoda	hermit crabs	Tribe Paguridea
brittle stars	Class Ophiuroidea	crabs	Order Decapoda
		sea stars	Class Asteroidea

Field surveys conducted by Chambers Group documented the species present in the intertidal zone during the fall of 2010 and the spring of 2012 (Chambers 2010 and 2012) (Appendix D). In addition, several other surveys of the rocky habitat at Lechuza Point have been conducted over the years (PISCO 2009, Raimondi 2012). The most recent of these was an intertidal survey was conducted in December 2009, as part of the Coastal Biodiversity Surveys, a large-scale research project designed to measure diversity and abundance of algal and invertebrate communities living on the rocky intertidal, western coast of temperate North America.

3.3.1.6 Marine Managed Areas

There is a wide array of both Federal and State managed marine areas off the coast of southern California. Over the last decade, efforts have been made to integrate some of these areas under a uniform system of management and oversight. For example, the California Marine Life Protection Act (MLPA) of 1999 required the evaluation of existing data for some 220,000 square miles of submerged State lands, and designated the California Department of Parks and Recreation (DPR) as the principal State agency for these areas. The following year, the California Marine Managed Areas Improvement Act of 2000 extended the DPR management jurisdiction into the marine environment. The purpose of both acts was to establish an integrated system of Marine Managed Areas (MMA), both existing and new, up and down the California coast that would ensure the long-term ecological viability and biological productivity of marine and estuarine ecosystems and preserve cultural resources for future generations. There are six categories of MMA: State marine reserves (SMR), State marine parks, State marine conservation areas (SMCA), State marine cultural preservation areas, State marine recreational management areas, and Areas of Special Biological Significance (ASBS).

Marine Sanctuaries, Parks, and Reserves

The Project site lies within one of two newly created marine protected areas encompassing the Point Dume area (Figure 3.3-5). The first area, the Point Dume State Marine Conservation Area (SMCA), extends from Encinal Canyon in the north to Westward Beach in the south. The second preserve, the Point Dume SMR begins at Westward Beach, and continues around Point Dume to the west end of Paradise Cove. These adjoining MPAs became effective on January 1, 2012.

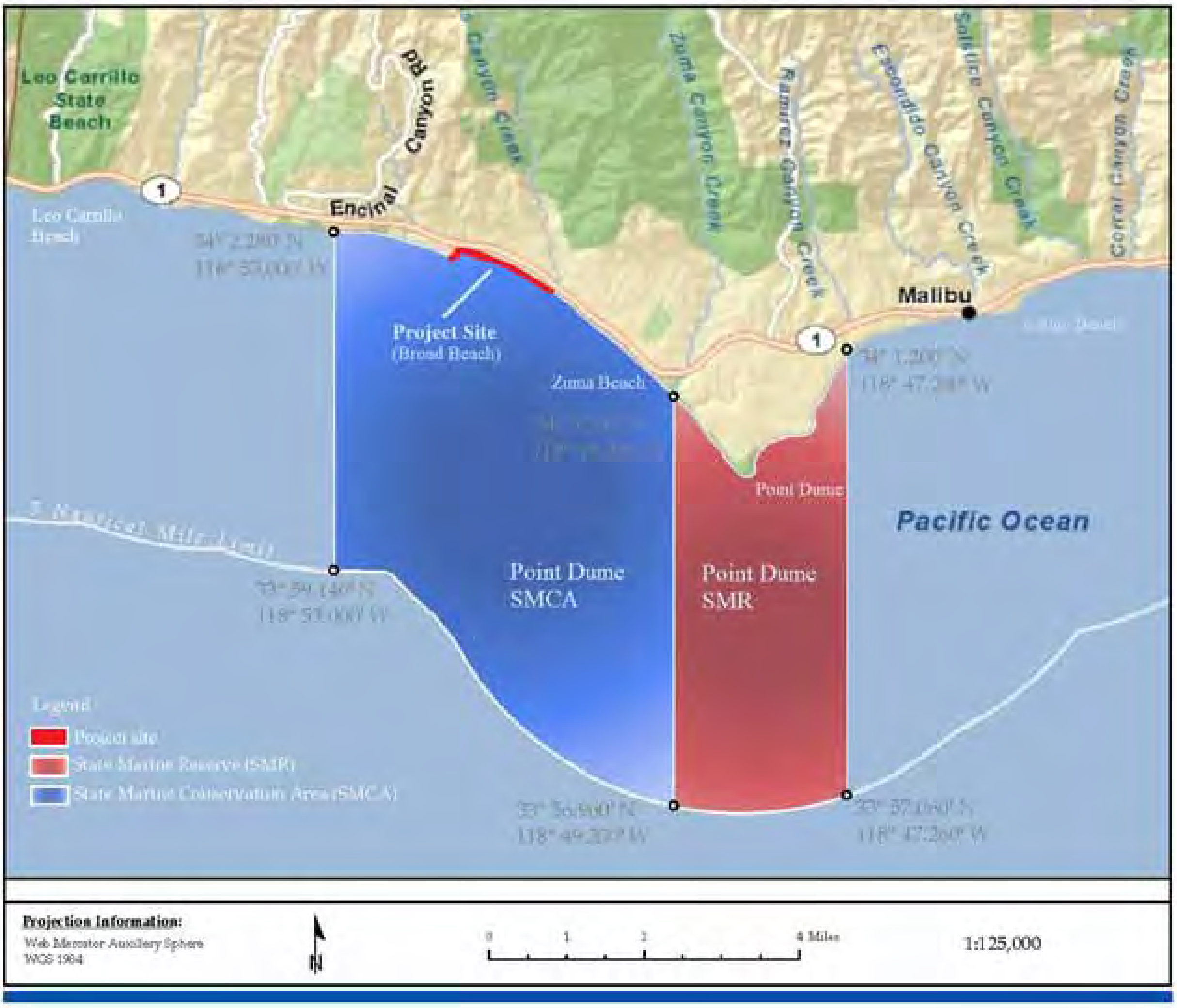
The Point Dume SMR incorporates an area of offshore reefs, a submarine canyon (Dume Canyon), and a kelp forest that is popular with kayak fishers and the diving community. Although access to the entire Point Dume area will remain open to scuba diving, boating and other recreational activities, the take of all living marine resources within this area is prohibited.[1] This area is described as “rare and vitally important habitat” and was one of the MLPA Science Advisory Teams top preservation priorities.

Within the Point Dume SMCA, fishing activities are also restricted, but not banned entirely; the recreational taking of pelagic finfish (i.e., thresher sharks, barracuda, dolphinfish) is allowed, as well as the take of white sea bass, and Pacific bonito by spear fishing. Limited commercial fishing of coastal pelagic fish (like squid.) is permitted in the SMCA but is restricted to capture by round-haul net. Round-haul fishing is a

[1] Take pursuant to beach nourishment and other sediment management activities is allowed inside the conservation area pursuant to any required federal, state and local permits, or as otherwise authorized by CDFG (ref http://www.dfg.ca.gov/mlpa/scmpas_list.asp CDFG website 10/12/12).

smaller operation than purse-seine boats or other methods. Commercial fishing of swordfish by harpoon is also allowed.

Figure 3.3-5. Marine Protected Areas



Source: Adapted from CDFG 2011.

Other nearby MPAs include several around the Channel Islands. In October 2002, the California Fish and Game Commission approved a comprehensive marine zoning network in the State waters of the Channel Islands National Marine Sanctuary (CINMS). The State implemented part of the marine zones in 2003, under the California Fish and Game regulations. Fishing and other extractive uses in the 10 marine reserves and two conservation areas created within the CINMS were restricted in 2006 to provide protection to the seafloor and groundfish (CDFG and CINMS 2001, CDFG 2002). The NMFS designated the Federal water portions offshore of the State marine zones as habitat areas of particular concern and prohibited bottom fishing under the Magnuson-Stevens Fishery Conservation and Management Act.

Additionally, on July 29, 2007, NMFS finalized a plan that added approximately 20 square miles of no-fish zone just off the southeastern coast of Santa Cruz Island and expanded the borders of several of the existing marine reserve areas. In total, the plan created 146.3 square miles of strict no-fishing marine reserves and 2.3 square miles of limited take marine conservancy zones. When taken in concert with the existing state marine reserves in the nearshore waters of the sanctuary, the combined sea life protection network totals nearly 215 square miles of fishing-restricted ocean waters (Figure 3.3-5).

Areas of Special Biological Significance

In the 1970s, California designated thirty-four regions along the coast as ASBS in an effort to preserve biologically unique and sensitive marine ecosystems for future generations. ASBS are designated by the State Water Resources Control Board (SWRCB) to protect species or biological communities from undesirable alterations in natural water quality (McArdle 1997). This designation recognizes that certain biological communities, because of their fragility or value, deserve special protection. Under the California Ocean Plan (COP), the discharge of wastes to ocean waters in these areas is generally prohibited. The COP states: “Waste shall be discharged a sufficient distance from areas designated as being of special biological significance to assure maintenance of natural water quality conditions in these areas” (State Water Board 1972).

One ASBS in southern California encompasses the Project area at Broad Beach. It extends offshore to 100 feet in depth for most of the 24 miles along the coast from just north of Mugu Lagoon in Ventura County to Latigo Point in the south. The Mugu-Latigo ASBS is the largest of the mainland ASBS in southern California, encompassing a total of 18.5 square miles of marine waters.

It is important to note that the Mugu-Latigo ASBS was set aside, “not because of any single unique component or habitat, but because of the multiplicity of distinct habitats and organisms in a relatively healthy state, which collectively make the area unique”. Specific organisms which were considered especially unique components of the ASBS at the time of its incorporation include: giant kelp, surf grass, sand dollars, Pismo clams, tube worms, sea urchins, and California halibut. These organisms were recognized for their ecological dominance within the community structure, and/or their contribution as recreational or commercially important species.

3.3.1.7 Commercial and Recreational Fisheries

Commercial and recreational fishing activities occur at various locations within the Project region that could potentially be impacted by activities associated with the

Project. Most of the region's commercial and recreational fisheries occur within the open-ocean habitat. Important recreational species in Santa Monica Bay include kelp bass (*Paralabrax clathratus*), brown rockfish (*Sebastes auriculatus*), pile perch (*Damalichthys vacca*), black perch (*Embiotoca jacksoni*), white seaperch (*Phanerodon furcatus*), rubberlip seaperch (*Rhacochilus toxotes*), señorita (*Oxyjulis californica*), and opaleye (Carlisle et al. 1964, Stephens et al. 1984b, MBC 1987, MBC 1993).

A wide variety of additional finfish and shellfish species are harvested in the Project region, while kelp is harvested in specific beds managed by the California Department of Fish and Game (CDFG). An analysis of fishery and kelp data collected around the Project area for the 10-year period from 2001 to 2010 forms the basis for the summary of commercial and recreational fishing that is included in Appendix D.

3.3.1.8 Ocean Acoustics

Ambient noise levels in the Project area include a combination of naturally occurring and anthropogenic sources (Table 3.3-9). Wind, surf, precipitation, biological noise, and seismic activity all contribute to the naturally occurring background noise levels found in the marine environment. Meanwhile, anthropogenic sources of noise include shipping, dredging and aggregate extraction, recreational activities, military operations, and scientific research. Variability in ambient noise in the sea is due, in large part, to variations in these noise sources, and levels at any given frequency may fluctuate by 10 to 20 decibels (dB) during the course of a day (Richardson et al. 1995).

Wind-generated noise results from various mechanisms, with oscillating bubbles in breaking waves representing the main source of noise above 200 Hertz (Hz) (Banner and Cato 1988). At low and moderate wind speeds, the greatest sound energy is generated in the range of 200 to 1,000 Hz. Wind noise varies with wind strength and other factors, including water temperature and density stratification. Typical noise levels are 66 ± 6 dB re 1 micro square Pascal per Hertz ($\mu Pa^2/Hz$) at 100Hz (a measure of sound-pressure density per unit frequency) for wind speeds 11.1 to 17.7 feet per second, though extreme levels up to 85 to 95 dB re 1 $\mu Pa^2/Hz$ at 141Hz are predicted during storm events (McCauley 1994).

The noise produced by vessel traffic represents one of the most pervasive forms of man-made noise in the ocean (McCauley 1994). In areas of high shipping density, vessel traffic produces a nondescript low frequency noise (< 500 Hz) that propagates extremely well in deep water. Shipping generally dominates ambient noise at frequencies from 20 to 300 Hz. Broadband source levels of ships between 180 and 280 feet in length are approximately 170 to 180 dB re 1 µPa, with most energy below 1 kHz (Richardson et al. 1995). Scrimger and Heitmeyer give source levels for 50 different merchant ships that range over 140 to 170 dB re 1 $\mu Pa^2/Hz$ between 100 to 700 Hz

(1991). Use of bow thrusters increases broadband sound levels, in one case by 11 dB, and includes higher frequency tonal components up to one kiloHertz (kHz).

Table 3.3-9. Sources of Ambient Marine Noise in the Project Area

Noise Source	Frequency (Hertz)	Pressure (dB re 1 µPA)
Ambient Ocean Noise		
Wind and waves	200–1000	66–95
Precipitation	>500	
Biological (shrimp, fish, mammals)	12–100,000	95–210
Baleen whales	15–8,000	150–190
Toothed whales, porpoises	400–8,000	150–190
Platform Operations	~ 5	119–127
Vessel Traffic		
Outboards and small boats	~100–1,000	150–160
Vessels 180 to 280 feet in length	<100–500	170–180
Large container ships, supertankers	<100–500	185–200
Military Exercises/Operations		
Low-frequency sonar activities	<2,000	Variable; ~160 at 2 km
Mid-frequency sonar activities	2,000–20,000	Variable

Sources: Adapted from Banner and Cato 1988, McCauley 1994, Scrimger and Heitmeyer 1991, and Richardson et al. 1995.

Note: dB re 1 µPa (decibels measured relative to one microPascal) is a measure of underwater sound pressure. 20 dB re 1 µPa is about the hearing threshold, while 140 dB re 1 µPa is the pain threshold. dB re 1 µPa2/Hz is a measure of sound-pressure density per unit frequency. It is used to describe sounds distributed across broad frequency bands.

Many marine species are highly dependent on sound for communication, navigation, foraging, and predator avoidance. Although knowledge in this area is limited, hearing capabilities have been studied for 22 of the approximately 125 species of living marine mammals and approximately 100 of the 25,000 species of bony fish. However, a significant limitation of the available data is that many of these studies, particularly for marine mammals, involve extremely small sample sizes, while data on fish have been collected mostly from freshwater species.

Of the cetaceans, baleen whales are thought to be most sensitive to low frequency sounds (~ 0.01 kHz to 5 kHz) based on characteristics of their auditory morphology and sound production. However, no empirical data on baleen whale hearing exist. Most odontocete cetaceans that have been directly tested have relatively good hearing sensitivity across a broader range of mid to high frequencies (~4 kHz to 100 kHz). A few odontocete cetaceans, including harbor porpoises and river dolphins, appear to be specialized for hearing very high frequency sounds (~4 kHz to150 kHz or higher) as well.

Pinnipeds are essentially “amphibious” in that they perform important life functions both above and below water. Consequently, their various auditory adaptations enable fairly sensitive hearing across fairly wide frequency bands in both air and water. They can be segregated into two functional underwater hearing groups.

Otariids (sea lions and fur seals) have been shown to be sensitive to a fairly wide range of mid frequencies (~1 kHz to 30 kHz), while walruses and phocids or “true” seals (harbor seals) are generally capable of hearing across a wide range of low to mid sound frequencies (~0.2 kHz to 50 kHz). The differences in hearing bandwidth in air between pinniped groups are less striking.

Little is known about hearing in sea otters. Hearing capabilities of sea turtles have not been studied in any depth since pioneering work from 1950 until the 1970s (Gales et al. 2003).

Fish sensitivity to noise depends on whether they have any sort of auditory mechanisms for improving hearing sensitivity (Southall 2005). Hearing “generalists” lack any sort of auditory mechanisms for improving hearing sensitivity. These species generally have relatively poor hearing sensitivity over a narrow band of low sound frequencies (~0.1 to 1.0 kHz). Hearing generalists are believed to comprise the majority of species. Hearing “specialists” have unique anatomical features that afford them greater hearing sensitivity over a relatively wider range of low sound frequencies (~0.1 to 3.0 kHz). Recent data indicate that some fish have specializations that allow them to detect ultrasonic sounds (~20 to 80 kHz) although only at relatively high sound pressure levels.

Studies have shown that some fish can determine the range and direction of underwater sound at frequencies ranging from 0.1 to 1.0 kHz even in the presence of background noise. However, limited existing research on the effects of sound on fish hearing and behavior has determined that exposure to some very loud sounds, such as seismic air guns, can produce no effect, or result in a range of effects from temporary hearing loss to more lasting damage to the haircells of fishes' inner ears (Popper and Halvorsen 2007).

The potential effects of noise on marine species, including mammals, sea turtles, and fish, are determined by radiated sound power levels, sound propagation characteristics, and the auditory and behavioral sensitivity of the species themselves. For example, the dominant components of the “communication” calls of most marine mammals fall within the 20 Hz to 20 kHz range. Richardson et al. (1995) predicted that the radii of audibility for baleen whales for production platform noise would be approximately 1.5 miles in nearshore waters and 1.2 miles near the shelf break. Croll et al. (2002) determined that the mating songs of fin whales are projected at approximately 20 Hz; the authors hypothesized that low-frequency anthropogenic sound could potentially interfere with a fin whale's ability to find or respond to a mate.

3.3.1.9 Aquatic Invasive Species

Researchers have identified more than 607 California estuarine species that are known or thought to be introduced (CDFG/OSPR 2002). As of 2006, more than 46 non-native species of marine plants and animals have been identified in the San Pedro Bay, while more than 250 non-native species had been found in the San Francisco Bay-Delta Estuary. In San Francisco Bay, the rate at which non-native, aquatic invasive species (AIS) are becoming established increased from an average of one new species every 55 weeks prior to 1960, to one new species every 14 weeks between 1961 and 1995 (Cohen and Carlton 1998). AIS constitute a significant threat to biodiversity in the world's coastal waters because they often have no natural predators and may out-compete native species for food in their new environment. Once established, invasive species can cause major environmental and economic harm as they multiply and spread. They can be very difficult, if not impossible, to control or eradicate following introduction into the receiving waters. According to the Santa Monica Bay Restoration Commission, improving the status of threatened and endangered species in the Bay requires minimizing and/or eliminating the effects of invasive species. Invasive plant and animals such as the giant reed, castor bean, wild tree tobacco, crayfish, bullfrog, mosquitofish, and largemouth bass have decreased the biological diversity of native ecosystems by outcompeting or displacing native species in the Bay. They also reduce habitat availability and water quality for native species in Santa Monica Bay.

3.3.2 Regulations Pertaining to the Public Trust

A variety of Federal, State, and local laws and regulations govern biological resources in and around the Project area. This section discusses the relevance of these statutes to the Project. In addition, quantitative guidelines, standards, limits, and restrictions promulgated in the regulations form the basis for many of the criteria used to evaluate the significance of the Project's impacts to biological resources.

<u>Federal</u>

The USFWS and the NMFS are the Federal agencies directly responsible for protecting biological resources in the Project vicinity, including coastal estuaries and marshlands. The Environmental Protection Agency (EPA) is also concerned with protecting marine and estuarine life through water quality standards. The U.S. Coast Guard (USCG) is responsible for enforcing U.S. maritime laws and regulations, including safe navigation, and enforcing environmental and pollution prevention regulations.

Federal legislation applicable to the protection of biological resources in the Project area is described below.

Bald and Golden Eagle Protection Act of 1940

The Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c), enacted in 1940 and amended several times since then, prohibits anyone from taking, possessing, or transporting a bald eagle or golden eagle or the parts, nests, or eggs of such birds without prior authorization. This includes inactive nests as well as active nests. The Act provides criminal penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle ... [or any golden eagle], alive or dead, or any part, nest, or egg thereof." The Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." Take means to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest, or disturb. Activities that directly or indirectly lead to take are prohibited without a permit.

Clean Water Act of 1972

The Federal Clean Water Act (CWA) was enacted as an amendment to the Federal Water Pollution Control Act of 1972, which outlined the basic structure for regulating discharges of pollutants to waters of the United States. The CWA serves as the primary federal law protecting the quality of the nation's surface waters, including lakes, rivers, and coastal wetlands.

Coastal Zone Management Act of 1972

The Coastal Zone Management Act (CZMA) encourages the management of coastal zone areas and provides grants to be used in maintaining coastal zone areas. It requires that federal agencies be consistent in enforcing the policies of state coastal zone management programs when conducting or supporting activities that affect a coastal zone. It is intended to ensure that federal activities are consistent with state programs for the protection and, where possible, enhancement of the nation's coastal zones. The Act's definition of a coastal zone includes coastal waters extending to the outer limit of state submerged land title and ownership, adjacent shorelines and land extending inward to the extent necessary to control shorelines. A coastal zone includes islands, beaches, transitional and intertidal areas, and salt marshes. According to the Coastal Act, the goal of each state's coastal management program should be achieving the wise use of the land and water resources of the coastal zone giving full consideration to ecological, cultural, historic and esthetic values and the need for compatible economic development.

Endangered Species Act of 1973

The federal Endangered Species Act (ESA) (16 U.S.C. § 1531 et seq.) protects the fish, wildlife, and plant species, along with their habitats, that have been identified by USFWS or National Oceanic and Atmospheric Administration National Marine Fisheries Service as threatened or endangered. *Endangered* refers to species, subspecies, or distinct population segments that are in danger of extinction throughout all or a significant portion of their range; *threatened* refers to species, subspecies, or distinct population segments that are likely to become endangered in the near future.

International Maritime Organization Resolution

The purposes of the International Maritime Organization are to provide machinery for cooperation among Governments in the field of governmental regulation and practices relating to technical matters of all kinds affecting shipping engaged in international trade; to encourage and facilitate the general adoption of the highest practicable standards in matters concerning maritime safety, efficiency of navigation and prevention and control of marine pollution from ships. The Organization is also empowered to deal with administrative and legal matters related to these purposes.

Magnuson-Stevens Fishery Conservation and Management Act of 1996

The Fishery Conservation and Management Act of 1976 (16 U.S.C. 1801 et seq.) established a fishery conservation zone between the territorial seas of the U.S. and 200 nautical miles offshore. It also established an exclusive US fishery management authority over fish within the fishery conservation zone (excluding highly migratory species) and Regulations for foreign fishing within the fishery conservation zone through international fishery agreements, permits and import prohibitions. National standards for fishery conservation and management were also described and eight regional fishery management councils were created to apply those national standards in fishery management plans.

Marine Mammal Protection Act of 1972

The 1972 Marine Mammal Protection Act established a Federal responsibility to conserve marine mammals with management vested in the Department of Interior for sea otter, walrus, polar bear, dugong, and manatee. The Department of Commerce is responsible for cetaceans and pinnipeds, other than the walrus. With certain specified exceptions, the Act establishes a moratorium on the taking and importation of marine mammals as well as products taken from them, and establishes procedures for waiving the moratorium and transferring management responsibility to the States. The law authorized the establishment of a Marine Mammal Commission with specific advisory and research duties. Annual reports to Congress by the Departments of Interior and Commerce and the Marine Mammal Commission are mandated.

Marine Protection, Research, and Sanctuary Act of 1972

The Marine Protection, Research, and Sanctuary Act of 1972 regulates the dumping of materials into ocean waters. It prevents, or restricts, dumping of materials that would degrade or endanger human health, welfare, or amenities, or the marine environment, ecological systems, or economic potentialities. The Act provides for a permitting process to control the ocean dumping of dredged material. The Act also establishes the marine sanctuaries program, which designates certain areas of the ocean waters as sanctuaries in order to preserve or restore these areas for their conservation, recreational, ecological, or aesthetic values.

Migratory Bird Treaty Act of 1918

The Migratory Bird Treaty Act (MBTA) (16 U.S. Government Code 703) enacts the provisions of treaties between the United States, Great Britain, Mexico, Japan, and the former Soviet Union and authorizes the U.S. Secretary of the Interior to protect and regulate the taking of migratory birds. It establishes seasons and bag limits for hunted species, and protects migratory birds, their occupied nests, and their eggs. Most actions that result in taking or in permanent or temporary possession of a protected species constitute violations of the MBTA. The United States Fish and Wildlife Service (USFWS) is responsible for overseeing compliance with the MBTA, and the U.S. Department of Agriculture's Animal Damage Control Officer makes recommendations on related animal protection issues.

National Invasive Species Act of 1996

This Act reauthorizes and amends the Nonindigenous Aquatic Nuisance Prevention Control Act of 1990 (P.L. 101-646, 16 U.S.C. 4701 et seq). The National Invasive Species Act of 1996 describes that once introduced, aquatic nuisance species are unintentionally transported and introduced into inland lakes and rivers by recreational boaters, commercial barge traffic and other pathways; preventative management measures are needed nationwide to prevent the further introduction and infestation of destructive species. The findings also state that nonindigenous species may compete with or prey upon native species of plants, fish, and wildlife, may carry diseases or parasites that affect native species, and may disrupt the aquatic environment and economy of affected nearshore area (16 U.S.C. 4701). Specifically, the Act authorizes regulation of ballast water, a key factor in the spread of aquatic invasive species; funding for prevention and control research; regional involvement with the Aquatic Nuisance Species Task Force; and education and technical assistance programs to promote compliance with the new regulations. NISA also includes specific actions for certain geographical locations, such as the Great Lakes, Chesapeake Bay, the Gulf of Mexico, and San Francisco Bay.

Oil Pollution Act of 1990

The Oil Pollution Act was signed into law in August 1990, largely in response to rising public concern following the *Exxon Valdez* incident. The OPA improved the nation's ability to prevent and respond to oil spills by establishing provisions that expand the federal government's ability, and provide the money and resources necessary, to respond to oil spills. According to the Act, the Federal government is required to direct all public and private response efforts for certain types of spill events; Area Committees, composed of federal, state, and local government officials, must develop detailed, location-specific Area Contingency Plans; and owners or operators of vessels and certain facilities that pose a serious threat to the environment must prepare their own Facility Response Plans.

Coast Guard Regulatory Authority

As the nation's only armed force with domestic law enforcement authority, the Coast Guard is involved daily in enforcing Federal law in the areas of drug interdiction, immigration, marine environmental protection, marine safety, fisheries, maritime security, and general Federal laws applicable at sea. The Coast Guard is charged with developing and enforcing regulations to ensure the safety of marine navigation, protect the environment, conduct search and rescue, enforce laws and treaties, and increase marine security.

State

The CDFG is the lead agency responsible for protecting biological resources at the state level. The CDFG is obligated to protect species that are officially listed as threatened or endangered by the State of California, candidates for listing as threatened or endangered, and California Species of Special Concern. The CDFG regulates fishing and hunting, protects the habitat quality of the State's biological resources, and administers the California Oil Spill Prevention and Response Act (OSPRA). The SWRCB sets water quality standards for the protection of aquatic life. The Los Angeles Regional Water Quality Control Board (LARWQCB) supervises these standards locally.

State legislation applicable to the protection of biological resources in the Project area is described below.

California Coastal Act

The California Coastal Act (Coastal Act) became law in 1976 to provide a comprehensive framework to protect and manage coastal resources. The main goals of the Act are to protect and restore coastal zone resources, to ensure balanced and orderly utilization of such resources, to maximize public access to and along the coast, to ensure priority for coastal dependent and coastal-related development, and to encourage cooperation between State and local agencies toward achieving the Act's objectives. This includes development and implementation by local governments of Local Coastal Programs (LCPs) that are consistent with the aims and goals of the Coastal Act, and certified by the California Coastal Commission (CCC).

The Coastal Act contains policies to guide local and State decision-makers in the management of coastal and marine resources. The Act identifies protective measures for nearshore marine resources.

Coastal Act Section 30230 states:

> *Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.*

Coastal Act Section 30231 states:

> *The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.*

Coastal Act Section 30234.5 states:

> *The economic, commercial, and recreational importance of fishing activities shall be recognized and protected.*

Coastal Act Section 30232 states:

> *Protection against the spillage of crude oil, gas, petroleum products, or hazardous substances shall be provided in relation to any development or transportation of such materials. Effective containment and cleanup facilities and procedures shall be provided for accidental spills that do occur.*

Coastal Act Section 30240 states:

> *Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas.*

> *Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas.*

California ESA

The California ESA, administered by the CDFG, parallels the main provisions of the Federal ESA. Under the California ESA, an “endangered species” is a species of plant, fish, or wildlife that is “in serious danger of becoming extinct throughout all, or a significant portion, of its range” and is limited to species or subspecies native to California. The California ESA establishes a petitioning process for the listing of threatened or endangered species. The CDFG is required to adopt regulations for this process and establish criteria for determining whether a species is endangered or threatened.

The California ESA prohibits “taking” listed species except as otherwise provided under state law. State lead agencies are required to consult with the CDFG to ensure that any action they undertake are not likely to jeopardize the continued existence of any endangered or threatened species or result in destruction or adverse modification of essential habitat.

California Fish and Game Code

The California Fish and Game Code, specifically, Sections 1601-1603, 1700, 2080.1 and 2081 address streambed alterations, outline restrictions on the trade, transport, and “take” of protected species, and the obligations regarding the marine resources of the state, including fisheries conservation and management.

California Harbors and Navigation Code

The California Harbors and Navigation Code regulates discharges from vessels within territorial waters. One of its purposes is to prevent vessel discharges from adversely affecting the marine environment. Section 151 regulates oil discharges and imposes civil penalties and liability for cleanup costs when oil is intentionally or negligently deposited in the waters of California.

California State Lands Act and Coastal Ecosystems Protection Act of 2006

On June 11, 1938, the State Lands Act created the California State Lands Commission (CSLC) and assigned it jurisdiction over state-owned offshore tide and submerged land leases.

The Coastal Ecosystems Protection Act of 2006 directed the CSLC to adopt performance standards for discharging ballast water by January 1, 2008, and prepare a report assessing the availability of treatment technologies to meet those standards (Falkner et al. 2009). The CSLC completed the rulemaking process and adopted the standards in October 2007 as part of its Marine Invasive Species Program. The technology assessment report was completed in December 2007. In response to the report's recommendations, the California Legislature passed Senate Bill 1781 (Chapter 696, Statutes of 2008), which delayed initial implementation of the performance standards from January 1, 2009, to January 1, 2010, and required an update of the technology assessment report by January 1, 2009. CSLC staff are currently conducting the necessary studies and developing rulemaking actions including: (1) establishing ballast water treatment technology testing guidelines; (2) promulgating regulatory language to specify the selection of sampling points (i.e., location) and sampling facilities (i.e., equipment) on vessels; and (3) identifying procedures and protocols for use by CSLC Marine Safety personnel to verify vessel compliance with the performance standards.

The CSLC is also mandated to adopt regulations governing the management of vessel fouling, specifically, introduction of nonindigenous invasive species via vectors other than ballast water.

California Marine Invasive Species Act of 2003

Originally passed in 2003, the purpose of the California Marine Invasive Species Act (Act) was to move towards eliminating the discharge of non-indigenous species into the waters of the State or into waters that may impact the waters of the State, based on the best available technology economically achievable. Since its passage, the Act has been amended several times, most recently in 2009.

The Act currently requires mid-ocean exchange or retention of all ballast water and associated sediments for all vessels over 300 gross register tons, United States and foreign, carrying ballast water into the waters of the state after operating outside the waters of the state. For all vessels over 300 gross register tons arriving at a California port or place carrying ballast water from another port or place within the Pacific Coast Region, the Act mandates near-coast exchange or retention of all ballast water

Los Angeles Water Quality Control Plan

The Water Quality Control Plan for the Santa Clara River and Los Angeles River Basins (Basin Plan) is the primary policy document that guides the LARWQCB. Established under the requirements of the 1969 Porter-Cologne Water Quality Control Act, the Basin Plan was originally adopted in 1975, and has been updated regularly. The most recent amendments to the Basin Plan were adopted in October 2009. The Basin Plan assigns beneficial uses (e.g., municipal water supply, water contact recreation) to all waters in the basin. The Basin Plan also sets water quality objectives, subject to approval by the EPA, intended to protect designated beneficial uses. The water quality objectives are achieved primarily through effluent limitations embodied in the National Pollutant Discharge Elimination System (NPDES) program.

Marine Life Protection Act

The Marine Life Protection Act (MLPA) of 1999 mandates the redesign of a statewide system of marine protected areas (MPA) that function, to the extent possible, as a network. The MLPA requires the evaluation of existing data for some 220,000 square miles of submerged State lands. Central to the MLPA are six goals intended to guide the development of MPA within California's State waters:

- To protect the natural diversity and abundance of marine life, and the structure, function, and integrity of marine ecosystems;
- To help sustain, conserve, and protect marine life populations, including those of economic value, and rebuild those that are depleted;
- To improve recreational, educational, and study opportunities provided by marine ecosystems that are subject to minimal human disturbance, and to manage these uses in a manner consistent with protecting biodiversity;
- To protect marine natural heritage, including protection of representative and unique marine life habitats in California waters for their intrinsic value;
- To ensure that MPA have clearly defined objectives, effective management measures, and adequate enforcement, and are based on sound scientific guidelines; and
- To ensure that the MPA are designed and managed, to the extent possible, as a component of a statewide network.

California Marine Managed Areas Improvement Act of 2000

Executive Order W-162-97 designated the DPR as the Principal State Agency for marine managed areas. The California Marine Managed Areas Improvement Act of 2000 extends the California DPR management jurisdiction into the marine environment. It also gives priority to marine protected areas adjacent to protected terrestrial lands. For example, more than 25% of the California coastline is within the State Park System. The act also established the California Marine Managed Areas System.

Porter-Cologne Water Quality Control Act

Since 1973, the SWRCB and its nine Regional Water Quality Controls Boards (RWQCBs) have been delegated the responsibility for administering permitted discharge into the coastal marine waters of California. Porter-Cologne provides a comprehensive water-quality management system for the protection of California waters and regulates the discharge of oil into navigable waters by imposing civil penalties and damages for negligent or intentional oil spills.

California Ocean Plan

The Water Quality Control Plan, Ocean Waters of California 2009 (Ocean Plan), is the policy document that guides the State Water Resources Control Board. The Ocean Plan is applicable to point and non-point sources of waste discharge into the ocean, but it is not applicable to vessel wastes or the control of dredge material disposal or discharge. The Ocean Plan specifies limits or levels of water quality characteristics for ocean waters to protect beneficial uses of ocean waters of California. These beneficial uses include industrial water supply, water and non-contact recreation, navigation, commercial and sport fishing, mariculture, preservation and enhancement of ASBS, rare and endangered species habitat, marine habitat, fish migration, fish spawning, and shellfish harvesting.

Executive Order W-59-93 – California Wetlands Conservation Policy

In August 1993, the Governor announced the California Wetlands Conservation Policy. The goals of the policy are to establish a framework and strategy that:

- Ensures no overall net loss and achieves a long-term net gain in the quantity, quality, and permanence of wetlands acreage and values in California in a manner that fosters creativity, stewardship, and respect for private property;
- Reduces procedural complexity in the administration of State and Federal wetlands conservation programs; and
- Encourages partnerships to make landowner incentive programs and cooperative planning efforts the primary focus of wetlands conservation and restoration.

The Executive Order also directed the California Natural Resources Agency to establish an Interagency Task Force to direct and coordinate administration and implementation of the policy. The Natural Resources Agency and the departments within that agency generally do not authorize or approve projects that fill or harm any type of wetlands. Exceptions may be granted for projects meeting all the following conditions: the project is water dependent; there is no other feasible alternative; the public trust is not adversely affected; and the project adequately compensates the loss.

Local

The City of Malibu Local Coastal Program

The city of Malibu has an LCP that has been certified by the California Coastal Commission as being consistent with the goals and directives of the California Coastal Act. This plan allows the city of Malibu to directly apply the development, conservation, environmental and public access protection goals of the Coastal Act to development within its jurisdiction. Relevant policies contained in Chapter 3, Marine and Land Resources, of the LCP are included in Table 3.5-8 in Section 3.5, Land Use, Recreation and Public Access of this APTR.

3.3.3 Public Trust Impact Criteria

This section describes criteria for evaluating the significance of Project-related activities or incidents that may result in impacts to marine biological resources. In general, the persistence, extent, and amplitude of such impacts dictate their significance. The significance of impacts to specific living resources can largely be determined from existing laws and regulations, such as the MMPA or the Federal or California ESA. The location of the impact, for example, if it occurs within a sensitive habitat such as a wetland or marine sanctuary, can also determine its significance.

Impacts to marine biological resources would be considered significant if the Project results in:

- Potential for any part of the population of a threatened, endangered, or candidate species to be directly affected, or if its habitat is lost or disturbed;
- Any "take" of a Federal- or State-listed endangered, threatened, regulated, fully protected, or sensitive species;
- Prolonged disturbance to, or destruction of, the habitat (or its functional habitat value) of a species that is recognized as biologically or economically significant in local, state, or Federal policies, statutes, or regulations;
- A net loss in the functional habitat value of: a sensitive biological habitat, including salt, freshwater, or brackish marsh; marine mammal haul-out or breeding area; eelgrass; river mouth; coastal lagoon or estuary; seabird rookery; or ASBS;
- Permanent change in the community composition or ecosystem relationships among species that are recognized for scientific, recreational, ecological, or commercial importance;
- Permanent alteration or destruction of habitat that precludes re-establishment of native biological populations;

- Potential for the movement or migration of fish or wildlife to be impeded; or
- A substantial loss in the population or habitat of any native fish, wildlife, or vegetation, or if there is an overall loss of biological diversity. Substantial is defined as any change that could be detected over natural variability.

An impact to commercial and sport fisheries would be considered significant if the Project would result in:

- Activities that would temporarily reduce any fishery in the vicinity by 10 percent or more during a season, or reduce any fishery by five percent or more for more than one season;
- Activities that would affect kelp and aquaculture harvest areas by 5 percent or more;
- Loss or damage to commercial fishing or kelp harvesting equipment; or
- Harvesting time lost due to harbor closures, impacts on living marine resources and habitat, and equipment or vessel loss, damage, or subsequent replacement.

3.3.4 Public Trust Impact Analysis

The Project could create adverse impacts on public trust marine biological resources through dredging and localized impacts on offshore habitats and species, as well as through beach nourishment and potential effects on biotic communities of the public trust tide and submerged lands. Changes in long-term sand transport down drift from borrow sites may also have adverse impacts to marine biological resources. This impact analysis includes impacts to the Broad Beach Restoration areas followed by the Off-site Project areas.

Broad Beach Restoration Area Impacts

Impact MB-1: Sand Placement Impacts to Marine Biological Resources

Sand placement from Project construction and one renourishment event would result in burial and disturbance of sensitive intertidal and subtidal habitats along Broad Beach. (Unsubstantial with Implementation of Avoidance and Minimization Measures, Class UI).

<u>Impact Discussion</u>

The habitats and species found offshore of Broad Beach lie within the jurisdiction of the Mugu to Point Dume ASBS and the Point Dume SMCA, and the coastal waters offshore the Project are designated as an Environmentally Sensitive Habitat Area (ESHA) under the Malibu LCP.

The deposition of sand on Broad Beach, and extension of the seaward footprint of the beach would result in the burial of existing intertidal and subtidal habitats that are recognized as being sensitive. This would affect sensitive rocky intertidal areas near Point Lechuza and along the western portions of Broad Beach, including kelp and surfgrass beds. Impacts would also occur to the sandy intertidal and subtidal areas along the remainder of the beach.

Extension of the beach profile would result in 100% mortality to the intertidal and subtidal organisms that are currently located within areas planned for the dunes and beach berm footprint. Although these organisms are adapted to frequent burial that lasts for weeks and sometimes months, the years-long burial and disturbance associated with the Project would be expected to eliminate these species. However, in areas along the Project periphery mortality would be somewhat lower as burial would be shallower and sand would be transported away from these areas relatively quickly. Additionally, the placement of sand would result in temporary increases in nearshore turbidity, resulting in the smothering or burial of additional organisms and habitat beyond the actual footprint of the proposed expansion. Turbidity plumes from dredge pipeline onshore outfalls restrained by training dikes have been observed to generally extend for 100 to 328 feet offshore and vary in width from 66 to 164 feet (Chambers Group 2012)

Although the Project design aims to limit impacts to the natural rocky habitat and surfgrass habitats that exist at the west end of Broad Beach near Lechuza Point by placing sand only on the upper beach, areas of the shoreline below the Mean High Tide Line (MHTL) in Lechuza Cove extending seaward for approximately 150 feet would be buried. The upper beach area proposed for dune and upper beach berm creation would be buried under 17 to 22 feet of sand depth tapering down to 1 to 2 feet deep on the seaward edge of the beach face.

Initial Project construction is estimated to result in direct burial of approximately 2 acres of rocky intertidal habitat (approximately 5 percent of the Project area). This would consist of areas of contiguous rocky intertidal habitat in Lechuza Cove to isolated areas of rock outcrops and boulder fields further east. Approximately 1 acre of surfgrass supported by lower intertidal rocky habitat may be directly or indirectly impacted by sand placement in Lechuza Cove. The duration and degree of impacts is difficult to estimate as various models and analytical analyses exist for projecting the duration of beach nourishment efforts (please refer to Section 3.1 *Coastal Processes*). However, although substantial mortality of intertidal species would occur during initial nourishment and the single planned renourishment event, all of these intertidal habitats are adapted to periodic burial by sand. Lower intertidal areas near Lechuza Point can be expected to become uncovered again in 1 to 2 years, while mid to upper intertidal habitats would be buried under beach berm and dunes over a 4 to 10 year period after initial nourishment. Thus, lower intertidal rocky habitats would begin recovering in approximately 1 to 2 years, while generally less productive mid to upper intertidal areas would be subject to long-term burial. Impacts of burial of such habitats would be extended and exacerbated by backpassing (refer to Impact MB-2 below) and would be generally repeated in an estimated 5 to 10 years with the single planned major renourishment event.

In addition to impacts to rocky intertidal habitats, proposed deposition of sand at Broad Beach in two nourishment events could incrementally increase sand coverage of, and turbidity impacts to, shallow subtidal rocky reefs located off of Lechuza Point and the west end of Broad Beach. These habitats could be impacted by an increased duration of sand burial or by dredging activities such as anchoring of the sand slurry pipeline. The Project includes pre-construction dives to site pipeline anchors to avoid impacting rocky reefs. However, while modeling indicates that added sand to the system would not affect offshore areas deeper than 15 to 17 feet water that support eelgrass and giant kelp habitats, shallow reefs that extend from these subtidal areas shoreward into lower intertidal areas could suffer increased sand coverage (Chambers Group 2012). Although many species on such shallow subtidal reefs are adapted to periodic sand coverage, it is unknown whether the greater predicted burials in the initial years following beach construction would be beyond their tolerance levels. Thus, the Project may incrementally affect species diversity and richness of near shore subtidal rocky reef habitats.

The deposition and placement of sand on the beach during both initial nourishment and a single major renourishment event would involve the repeated transit of heavy construction equipment (e.g., dozers, skiploaders) along the beach from the staging area located at the western end of Zuma Beach. This would result in additional disturbance and degradation to the sandy shoreline habitats along Broad Beach, directly affecting invertebrate species such as sand crabs.

Sandy intertidal areas also provide key foraging, nesting and overwintering habitat for a variety of coastal seabirds and shorebirds, including the federally threatened western snowy plover and federally threatened California least tern. No western snowy plover nesting occurs on Broad Beach or Zuma Beach, although the far eastern end of the Project area and adjacent Zuma Beach are designated as critical habitat for this species. During the initial beach nourishment project, heavy equipment operation could disturb foraging by such species over the 6-month construction period while burial, disturbance and reduction of food sources over the 6 months to one year following beach restoration could incrementally impact such species. The potential for impacts to breeding western snowy plovers or California least terns are considered of very low probability given absence of suitable existing nesting habitat on Broad Beach and lack of past breeding activities.

Additionally, sandy intertidal habitat provides spawning areas for species like the California grunion. Grunion spawning grounds are considered sensitive habitat under the Malibu LCP because the continued success of the species depends on the availability of spawning habitat. Broad Beach is currently a low tide beach with little or no sandy beach berm or persistent beach face which severely limits its potential as California grunion spawning habitat. This beach is backed by a variety of coastal protection structures, including the emergency revetment, which further limit suitable spawning habitat through displacement and potential for increased wave reflection back across the existing low tide beach. Further, although grunion have been observed spawning at the western end of Zuma Beach, they are not known to spawn on Broad Beach and their potential to utilize this beach for spawning under existing conditions is considered low. ..

Although sensitive species such as the western snowy plover and California grunion are not anticipated to utilize Broad Beach for nesting or spawning under existing conditions, successful restoration of Broad Beach and the adjacent dune system would greatly increase the suitability of this beach for nesting and spawning activities by these species. While the potential for successful reuse of Broad Beach by these species cannot be definitively forecast, the renourishment event has the potential to create substantial effects upon these species should successful nesting and spawning occur. Therefore, the Project would potentially create and maintain habitat for nesting and spawning by these sensitive species, but could also potentially impact the newly created habitat via renourishment activities.

Sandy subtidal areas located offshore of the majority of Broad Beach provide valuable habitat for key invertebrate species including sand dollars, crabs and potentially Pismo clams, as well as foraging areas for various demersal fishes. These areas may also be impacted by increased burial, turbidity disturbance from anchoring of slurry pipelines etc.

Avoidance and Minimization Measures

AMM MB-1a: Sand Placement Footprint Limitation. Construction contracts shall specify that all initial sand deposits during nourishment events shall be placed on the upper beach at the western 900 feet of the Project area near Point Lechuza. Sand placement and mechanical distribution will be limited to areas falling within 150 feet of existing homes. To maximize sand dispersion over time and reduce the depth of burial of lower intertidal rocky habitat, sand in the western 900 feet of Broad Beach shall be placed in two separate intervals so that only half the total amount of sand is placed at one time. The intervals shall be at the beginning of the placement, and then at the last stage of placement to allow the maximum time span between placements

AMM MB-1b: Rocky Subtidal and Intertidal Habitat. The Project Applicant shall pay fees to California State Lands Commission (CSLC) to offset the short- to mid-term loss of or damage to rocky subtidal and intertidal and surfgrass habitats associated with the Project. Fees shall be based upon the loss of 2 acres of such habitat and be sufficient to fund creation of 4 acres of shallow subtidal offshore reef and/or rocky intertidal habitat, including surfgrass restoration. Alternatively, such fees may go to subtidal and intertidal rocky habitat protection, restoration and or enhancement projects. Such habitat creation, protection and restoration efforts shall be located within the Point Dume State Marine Conservation Area or Point Dume State Marine Reserve to the extent feasible. If this is not feasible, projects within Santa Monica Bay may be considered. CSLC should consult with appropriate local, State and Federal agencies over such projects.

AMM MB-1c: Monitoring for Grunion. If possible, construction activities shall be conducted outside the spawning season for grunion (March through August). If construction cannot be avoided during this period, pre-construction biological surveys for spawning grunion shall be conducted by a certified biologist. If spawning is observed, construction will halt in that area, and the spawning area plus a 250-foot buffer to each side of the spawning area will be protected from Project activities until after the next spring tides (approximately 10 days to 2 weeks).

Rationale for Avoidance and Minimization Measures

Burial of sensitive intertidal habitat, increased subtidal turbidity, and potential disturbance of sensitive species during project construction would be minimized to the maximum extent feasible via the Avoidance and Minimization Measures (AMMs). However, it is likely that sand burial and coverage of rocky intertidal and subtidal habitat would substantially increase under the Project and endure for up to 10 to 20 years. Creation of rocky intertidal habitat may face technical challenges related to longevity of creating such habitat in the coastal process zone; surfgrass restoration or transplanting has had some limited success. Creation of shallow subtidal reefs may have greater potential for success. Protection, restoration or enhancement of local subtidal and intertidal habitats presents another option to at least partially offset project impacts.

Burial of intertidal habitat would still occur with AMMs; however, burial of this habitat area currently occurs on an intermittent basis. The Project would extend the duration and increase the frequency of burial during the time that Project-deposited sand remains within the Project area. Creation, restoration, enhancement or protection of such habitats would permit full offset of potential impacts. Impacts to sensitive species would be reduced through application of AMMs.

Monitoring for grunion spawning would ensure that if grunion begin to use Broad Beach in the future, they would be protected from the effects of sand placement until after their eggs have hatched and the larvae been washed out to sea.

Impact MB-2: Backpassing Impacts to Marine Resources

Annual or biannual backpassing would prolong disturbance of both rocky and sandy intertidal habitats impacting intertidal species diversity and abundance (Unsubstantial with Implementation of Avoidance and Minimization Measures, Class UI).

Impact Discussion

Backpassing would involve frequent annual or biannual disturbance of sandy and to a lesser extent rocky intertidal habitats over a project life estimated at 20 years, with up to 40 backpassing events during the life of the Project. Backpassing, as currently proposed, would disturb significant areas of the beach over the long term, with heavy equipment excavating approximately 10 acres along the easternmost 2,000 feet of beach to a depth of five feet and transporting this sand for 1,000 to 3,000 feet east along Broad Beach via heavy scrapper or haul truck for deposition on the west end of the beach. The receiver or fill site would be approximately 100 feet wide and extend along 2,000 feet occupying almost 4.6 acres. A total of 50,000 to 100,000 cubic yards (cy) of sand would be moved during each backpassing event. Thus, either annually or biannually, approximately 15 acres, or 34 percent, of the 44-acre Project area would be subject to direct high levels of disturbance with damage to or high mortality of intertidal and high intertidal species. Additional impacts would occur within the transit zones, which would be located in intertidal areas to be far removed from existing homes.

Backpassing on this scale is typically practiced at highly managed and/or artificially created beaches such as those in Long Beach Harbor or Newport Beach. Such beaches are largely recreationally oriented and may lack the existing intact natural systems and habitats that remain present at Broad Beach, at least in intertidal and subtidal areas. The high intertidal zone of mainland southern California beaches supports a diverse and important macroinvertebrate community with macrophyte wrack as a food base (Dugan et al. 2008). The high intertidal macroinvertebrate communities provide a food base for foraging gulls and shorebirds, including western snowy plover. High intertidal habitats (e.g., beach strand) and macroinvertebrate sand beach community in southern California mainland beaches has been lost or impacted by a variety of factors including coastal armoring, beach grooming, and sea level rise (Chambers Group 2012).

Frequent backpassing would transform existing subtidal and intertidal habitats along Broad Beach that currently functions as a largely natural beach into a highly managed beach. Repeated disturbances of large areas of Broad Beach would prevent full recovery of intertidal and high intertidal species, particularly within the 15 acres (34 percent) of Broad Beach designated as backpassing borrow and fill sites. Transit corridors, particularly the intertidal beach, would also be impacted. While species in these habitats are accustomed to disturbance and are known to recover quickly, the resiliency of these habitats to repeated longer term disturbances of this scale is not well understood. Effects may be similar to repeated beach grooming, where species begin to recover from major nourishment or the most recent backpassing, only to be disturbed again. Over the 20-year Project life, the level of backpassing proposed would result in the transformation of the currently functioning largely natural sandy and rocky intertidal habitats, into a more managed beach environment, with consequent loss of natural species richness and diversity. Opportunities for this beach to develop and evolve into a more diverse and natural functioning intertidal and high intertidal beach habitat in place of existing habitats may be substantially curtailed by the extent and frequency of disturbance associated with backpassing.

In addition, a newly restored Broad Beach would have all the attributes of a grunion spawning beach. While creation or restoration of a grunion spawning beach would be a beneficial effect of the initial nourishment, backpassing during the grunion spawning season could adversely impact spawning grunion.

Avoidance and Minimization Measures

AMM MB-1c *Monitoring for Grunion* would also apply to this impact.

AMM MB-2a: Sand Backpassing Limitation. Backpassing borrow areas shall be limited to 1,000 feet of beach at the east end and not more than 5 acres. Backpassing shall convey sand to the upper margins of the beach berm and toe of the dune system in the western 900 feet of Broad Beach. Sand transported from backpassing will not be placed or redistributed further seaward than 100 feet from toe of dunes or 150 feet from existing development. Backpassing vehicle corridors shall be clearly defined and limited to minimize beach disturbance. Backpassing will be limited to one 2-week period annually.

AMM MB-2b: Beach Habitat Management Plan. The applicant shall prepare, submit and implement a Beach Habitat Management Plan (BHMP). The BHMP will set forth measures to minimize the impacts of backpassing and maintain biological productivity of intertidal and high intertidal habitats, including but not limited to prohibition of grooming, creation and maintenance of areas of beach wrack and beach strand habitat on areas of the berm outside of backpassing borrow and deposition zones.

Rationale for Avoidance and Minimization Measures

Limitations on the extent of beach disturbance associated with and the frequency of backpassing operations would permit more time and recovery of intertidal and high intertidal species and limit disturbance of these species. Preparation of a BHMP would permit enhancement of some additional areas along the beach to offset long term disturbances.

The newly created beach, once at equilibrium, would include a similar area of intact intertidal habitat as currently exists. Impacts to the sensitive intertidal and high intertidal beach habitats and species would be reduced through application of AMMs.

Monitoring for grunion spawning would ensure that if grunion begin to use Broad Beach in the future, they would be protected from the effects of backpassing until after their larvae have hatched and been washed out to sea.

Off-site Project Areas

Impact MB-3: Dredging Impacts to Marine Resources

Dredging would result in loss of benthos, temporary increases in turbidity, and temporary displacement of demersal fish species at the sand source sites (Unsubstantial, Class U).

Impact Discussion

Dredging at the sand source sites offshore Trancas Creek, Dockweiler Beach, and Ventura Harbor would result in nearly 100 percent mortality to benthic invertebrates living in the dredged sediments as well as localized, but temporary, increases in turbidity. Most of the benthic invertebrates within the areas dredged from the sand source sites would experience mortality as a result of the dredging; however, some highly mobile invertebrates such as crabs may escape the dredge. Indirect impacts would occur to demersal fishes from temporary disturbance or displacement, and from potential reductions in their prey base of benthic invertebrates.

Dredging can also mobilize contaminated sediments, if present, into the water column and deleteriously affect marine organisms that come in contact with or ingest them. The dredging areas consist of approximately 115 acres at the Dockweiler site and 24 acres at the Central Trancas site. The benthic invertebrate communities at these sand source sites are typical of most southern California soft bottom habitats at these depths. The Ventura Harbor sand trap is not considered as benthic habitat as it is regularly dredged by U.S. Army Corps of Engineers (USACE).

Dredging would generate turbidity plumes by the resuspension of sediments. Additional turbidity could be generated by the placement and removal of barge mooring anchors and other seafloor equipment. Hard bottom and vegetated habitats, including surfgrass, eelgrass, giant kelp and other kelp species occur off Broad Beach west of the Central Trancas sand source site. However, these sensitive habitats are over 2,000 feet from the proposed Trancas dredging site. The sediments at the Trancas site consist of mostly fine to very fine sand with a median grain size range between 0.12 and 0.15 millimeters. These larger sediments settle rapidly after disturbance and dredging at this site would not be expected to generate extensive turbidity plumes.

A sand source site with similar sediment composition was dredged in 2001 for the San Diego Regional Beach Sand Project using a hopper dredge and turbidity at the dredge site was monitored (AMEC 2002). Turbidity plumes generally were only observed close to the dredge and dissipated quickly. The largest plume reported was 330 feet by 67 feet and it dissipated quickly. Dredging at the Central Trancas site would not be expected to generate turbidity plumes that would reach eelgrass, surfgrass or kelp at the western end of Broad Beach. Sediments at the Dockweiler Site are slightly coarser than at the Central Trancas Site. Therefore, turbidity would be expected to be less during dredging at that site; no sensitive marine habitats occur in the vicinity of the Dockweiler Site.

The noise and turbidity generated during dredging would disturb fish in the vicinity of the dredge. Fish would be expected to avoid the dredging area during dredging operations. Fish sampling was conducted following dredging in Marina del Rey Harbor and an unusually low number of fish species was collected compared to pre-dredging surveys (Soule et al. 1993). The investigators concluded that the dredging had disturbed the fish. However, within a few months, the number of fish species collected returned to pre-dredging levels. Similarly, surveys of the Surfside/Sunset borrow site off Orange County found fewer fish immediately following a 1990 dredging episode, but within less than a year there were no differences compared to control areas (Chambers Group 1992).

Laboratory studies have found that all life stages of estuarine and coastal fishes can survive high levels of turbidity for 24 hours or more (La Salle et al. 1991, Clarke and Wilber 2000). Fish within the Trancas and Dockweiler source sites would not be expected to be exposed to high enough sediment concentrations for long enough duration to suffer lethal or sublethal effects. Because subtidal soft bottom habitat is the dominant habitat offshore Los Angeles County, temporary avoidance of the immediate dredging area and the turbidity plume generated during dredging would have minimal adverse impact on fish.

Dredging at the offshore sand source sites will temporarily reduce the invertebrate prey base for fish such as turbots and white croakers that feed on benthic invertebrates. Recovery of the benthic invertebrate community is expected to begin less than a year, with complete recovery in one to 2 years. However, temporary degradation of a relatively small amount of foraging habitat is not expected to have a significant impact on fish.

Recovery of the benthic invertebrate community would be expected to begin almost immediately with settlement of larvae and immigration of mobile species from nearby unaffected areas. Recovery of the infaunal community to values comparable to pre-dredging levels may occur in as little time as 6 months or require as long as 4 years (CSLC, USFWS, and USACE 2001; SAIC 2011). However, since the sand source sites for the Project are on offshore sand bottoms at depths frequently disturbed by the surge associated with large waves, recovery would be expected to be in the shorter end of this range.

The temporary nature of disturbances caused by dredging activities has been documented in several studies within the southern California area. Reish (1981) documented recovery of a sand source site off Sunset Beach in Orange County that has been used for many years by the USACE for beach nourishment. The site was originally sampled in1977 before the first sand was dredged, and then again in 1978, 1979, and 1980 after dredging. It was concluded that the dredging and sediment removal did not have any measurable effect on the benthic fauna. Periodic sampling following a 1990 dredging of the same borrow site initially found fewer macroinvertebrates than in undredged control areas, but within less than 1 year there were no differences compared to control areas (Chambers Group 1992).

Additionally, Chambers Group (1996) sampled a borrow pit within Long Beach Harbor and found that the abundance, number of taxa, and species composition within the borrow site was similar to that of shallower areas outside the pit.

Finally, sampling of three sand source sites used to obtain sand for the San Diego Regional Beach Sand Project found that invertebrate populations at the site in 2009, following 2001 dredging of the sites, were similar to the populations in 1999 before the dredging (SAIC 2011).

No sensitive habitats or species were observed during recent field surveys at the proposed sand source sites (Chambers Group 2010). Additionally, the organisms observed during the field surveys at Trancas and Dockweiler are adapted to shifting sands and would be expected to rapidly recolonize these areas after the completion of dredging. Therefore, although impacts to the benthic invertebrate community are expected to be substantial, they would be temporary as the benthic community would rapidly reestablish itself. Further, sandy benthic habitat is so abundant in the local marine environment that any biota that are displaced but not killed would be able to quickly re-establish within adjacent areas.

<u>Avoidance and Minimization Measures</u>

No AMMs are recommended for Impact MB-3.

The Project would result in short-term disturbance to the Trancas and Dockweiler borrow sites, if used. These benthic habitats would recover to pre-dredge conditions within approximately 1 to 3 years without mitigation measures.

Impact MB-4: Construction and Vessel Traffic Impacts to Commercial and Recreational Fishing

Increased vessel traffic offshore the Project site and offsite areas could restrict fishing in the Project area and cause losses or damage to fishing gear in the area (Unsubstantial, Class U).

Impact Discussion

Increased vessel traffic raises the probability of interactions with recreational and commercial fishermen and their gear. Placement of a dredge offshore and transit between the sand source sites could result in conflicts with local fisheries. The initial nourishment would include approximately 600 barge transits. These transits would occur in heavily trafficked waters offshore southern California. Recreational and commercial fishermen are accustomed to high levels of large vessel traffic in this area, and the number of trips associated with the Project would not substantially affect these users. The offshore dredge areas at Dockweiler and Trancas were not identified as areas of significance to recreational and commercial fisheries. Therefore, the presence of the dredge in this location during Project activities would not substantially affect recreational or commercial fisheries. The dredge vessels would operate using dynamic positioning and would not anchor during dredge activities. If a tug and barge are used to transport dredged materials, the barge would be anchored temporarily while the sand slurry is pumped to shore. No permanent features (e.g., rock anchors, permanent pipeline anchors, etc.) would be placed on the seafloor during dredging or pumping of dredged material to shore, so the risk of damage to fishing gear from the Project would be minimal and would not persist after the conclusion of dredging and nourishment. Furthermore, placement of the sand discharge line on the seafloor and its offshore connection to Broad Beach would be a temporary feature that would not impact commercial or recreational fishing. In summary, the Project would have no substantial impacts to recreational or commercial fisheries.

Avoidance and Minimization Measures

No AMMs are recommended for Impact MB-4.

Impact MB-5: Construction and Vessel Traffic Operations Impacts to Marine Mammals and Turtles

Noise from vessel traffic and project operations can mask reception capabilities and startle or injure marine species while entanglement or collisions with vessels can injure or kill protected species (Unsubstantial with Implementation of Avoidance and Minimization Measures, Class UI).

Impact Discussion

Marine vessel traffic in the immediate vicinity of the project site is relatively low due to the large distance to regional ports and harbors, and the relatively limited range of most recreational vessels. However, recreational activity in the area is relatively intensive, with many small beach-launched sailboats, windsurfers, paddleboards and kayaks in the water on a typical day.

Traffic increases would heighten the probability of vessel collisions with marine animals as well as result in a temporary increase in background marine noise levels from the operation of the dredge and support vessels. Additionally, placement of dredge pipelines from offshore onto Broad Beach could impact foraging or migrating whales. If impacts to marine mammals or turtles occur from increases in vessel traffic, they would be significant because several marine mammal species, and all four of the marine turtles, known to inhabit the region are protected under the Federal ESA. In addition, all marine mammal species are granted additional protection under the Marine Mammal Protection Act of 1972.

In general, pinnipeds and odontocetes tend to be tolerant of vessels. The level of avoidance of baleen whales to vessels appears to be related to the speed and direction of approaching vessels (Richardson et al. 1995). Whales seem most responsive when the sound level is increasing or when a noise source first starts up, such as during a brief playback experiment or when migrating whales are swimming toward a noise source. The limited available data suggest that stationary industrial activities producing continuous noise result in less dramatic reactions by cetaceans than do moving sound sources, particularly ships. Some cetaceans may partially habituate to continuous noise.

Gray whales have been observed to change course at a distance of 650 to 1,000 feet in order to move around a vessel in their paths. On the other hand, some gray whales have not been observed to react until a ship is within 50 to 100 feet. Humpback whales have been observed to avoid vessels and change behavior when a boat approached within a half mile.

Dolphin and whale species exposed to close physical approaches as well as noise from different vessels may alter motor behaviors (Janik and Thompson 1996, Nowacek et al. 2001, Williams et al. 2002, Hastie et al. 2003) as well as vocalization characteristics (Lesage et al. 1999, Au and Green 2000, Van Parijs and Corkeron 2001, Buckstaff 2004, Foote et al. 2004). These changes in behavior have both direct energetic costs and potential effects on foraging, navigation, and reproductive activities. Vessel traffic noise may elicit a startle reaction from marine turtles and produce temporary sublethal stress (NRC 1990).

Fish could also be impacted by routine activities such as dredge or ship traffic noise. Studies suggest that the noises produced by fishing and by underwater construction cause avoidance behaviors in fish (EPA 1980). However, the temporary nature of the offshore portions of the Project is not expected to substantially impact fish.

Avoidance and Minimization Measures

AMM MB-5a: Marine Mammal and Turtle Contingency Plan. The Applicant shall ensure that a marine mammal and sea turtle avoidance contingency plan is developed and implemented for all vessel operators (including tows, barges, launches) that focuses on recognition and avoidance procedures. The plan shall be submitted prior to any offshore activities for approval and reports shall be submitted to California State Land Commission. Minimum components of the plan include:

1. All vessel operators shall be trained by a marine mammal expert to recognize and avoid marine mammals and turtles prior to Project-related activities. Training sessions shall focus on the identification of marine mammal and turtle species, the specific behaviors of species common to the Project area and transport routes, and awareness of seasonal concentrations of marine mammals and turtles.
2. A minimum of two observers shall be placed on all support vessels during the spring and fall gray whale migration periods (generally December through May), and during periods/seasons when other marine mammals, such as migrating fin, blue, and humpback whales (generally June through November), are known to be in the Project area in relatively large numbers. Observers can include the vessel operator and/or crew members, as well as any Project worker that has received proper training. Vessel operators and crews shall maintain a vigilant watch for marine mammals and sea turtles to avoid striking sighted protected species.
3. Vessel operators will make every effort to maintain a distance of 1,000 feet from sighted whales, and 150 feet or greater from sea turtles or smaller cetaceans whenever possible.
4. When small cetaceans are sighted while a vessel is underway (e.g., bow-riding), vessel operators shall attempt to remain parallel to the animal's course. When paralleling whales, vessels will operate at a constant speed that is not faster than the whales' and shall avoid excessive speed or abrupt changes in direction until the cetacean has left the area.
5. Per NOAA recommendations, and when safety permits (i.e., excluding during poor sea and weather conditions, thereby ensuring safe vessel maneuverability under those special conditions), vessel speeds shall not exceed 11.5 mph (10 knots) when mother/calf pairs,

groups, or large assemblages of cetaceans (greater than five individuals) are observed near an underway vessel. A single cetacean at the surface may indicate the presence of submerged animals in the vicinity; therefore, prudent precautionary measures, such as decreasing speed and avoiding sudden changes in direction, should always be exercised. The vessel should route around the animals, maintaining a minimum distance of 300 feet whenever possible.

6. Whales may surface in unpredictable locations or approach slowly moving vessels. When an animal is sighted in the vessel's path or in close proximity to a moving vessel and when safety permits, operators will reduce speed and shift the engine to neutral. Vessel operators will not engage the engines until the animals are clear of the area.
7. Support vessels (i.e. barge tows) shall not cross directly in front of migrating whales, other threatened or endangered marine mammals, or marine turtles.
8. Vessels shall not separate female whales from their calves.
9. Vessel operators will not herd or drive whales.
10. If a whale engages in evasive or defensive action, support vessels will drop back until the animal moves out of the area.
11. Collisions with marine wildlife will be reported promptly to the Federal and state agencies listed below pursuant to each agency's reporting procedures.

    National Marine Fisheries Service
    Southwest Region, Stranding Coordinator
    Long Beach, CA 90802-4213
    (562) 980-3230 or (562) 506-4315 (24 hr cell)

    California State Lands Commission Mineral Resources Management Division
    Sacramento, CA 95825-8202
    (562) 590-5201

<u>Rationale for Avoidance and Minimization Measures</u>

Avoidance of marine mammals and turtles can be facilitated through training and education of vessel operators as to recognize, understand, and minimize conflict with marine species. Implementation of the marine mammal/turtle observer requirement and the proposed speed limitation would substantially reduce the potential for adverse impacts to marine mammals and turtles.

Implementation of AMM MB-5a would reduce the potential for adverse impacts to marine mammals and turtles. However, the potential for strikes to marine mammals or turtles would remain after implementation.

Impact MB-6: Impacts to Marine Resources from Potential Fuel or Oil Release

The increased vehicle and marine vessel traffic associated with the Project would result in an increased risk of oil or fuel release as a consequence of onshore spillage, vessel allision, collision or grounding (Unsubstantial with Implementation of Avoidance and Minimization Measures, Class UI).

Impact Discussion

As discussed in Section 3.2, *Marine Water and Sediment Quality,* the Project would involve increased vessel traffic due to dredging of sand sources at the Dockweiler site and/or Ventura Harbor sand trap and transport of sediment to Broad Beach, which would increase the chances of a fuel release from the hopper dredge or tugboats. A typical hopper dredge holds 150,000 gallons of fuel oil, while a typical tugboat holds 35,000 gallons of fuel oil. The chance of an allision, collision or grounding occurring during the Project is estimated at 19% (Section 3.14, *Marine Vessel Safety*); however, that likelihood mostly includes minor incidents within the port while maneuvering, or incidents involving the barge which would not hold any fuel or oil. The Project would also involve increased traffic from vehicles and diesel fueled equipment on Broad Beach during beach construction activities. This would also increase the chances of potential fuel spills.

If not quickly contained, a spill of fuel oil from Project vessels and vehicles would potentially impact a variety of marine biological resources. Fuel oil represents a physical and chemical hazard, and intertidal organisms are especially vulnerable to the physical effects of oil (Percy 1982). Sessile species, such as barnacles, may be smothered, while mobile animals, such as amphipods, may be immobilized and glued to the substrate or trapped in surface slicks in tidepools. It has been hypothesized (Hancock 1977) that organisms in the upper intertidal areas where the oil dries rapidly are more apt to be affected by physical effects of fuel oil, such as smothering, whereas organisms in the lower intertidal areas are more exposed to the chemical toxic effect of the liquid petroleum.

Plankton populations on the open coast are expected to have low vulnerability to a Project-related fuel oil spill. Even if a large number of individual organisms contacted the fuel oil, rapid replacement by individuals from adjacent waters is expected. In addition, the regeneration time of phytoplankton cells is rapid (9 to 12 hours) and zooplankton organisms are characterized by wide distributions, large numbers, short generation times, and high fecundity (NRC 1985).

Open coast sandy beaches, like those generally located in the Broad Beach Restoration Area and along the Offsite Project Areas would not be expected to suffer long-term damage from a Project-related fuel oil spill. Once the fuel oil has been removed, recolonization by sandy beach organisms tends to be rapid (Aspen 2005). However, if large amounts of fuel oil coat the beach, substantial loss of intertidal organisms could occur.

Any spills occurring within the Port of Los Angeles/Long Beach or at the Ventura Harbor sand trap would be subject to rapid response from oil spill cleanup services that are stationed in several locations within the Port and Harbor. Spills occurring along the transit routes would be initially responded to with on-board equipment, with subsequent cleanup support from the U.S. Coast Guard (USCG), CDFG's Office of Spill Prevention and Response, and private contractors hired by the ship operators.

The hopper dredge (being over 300 gross register tons) would be required to contract for on-water recovery and storage resources sufficient to respond to all spills up to the reasonable worst case spill volume, and would be required to prepare an Oil Spill Contingency Plan (OSCP, California Code of Regulations, Title 14.1.4.3.4, Sections 825.01-827.02, *Oil Spill Contingency Plans, Nontank Vessels*). Tugboats used for the Project would be under the 300 gross ton level, and would thus not be required under California law to prepare an OSCP. Implementation of AMM WQ-4a, which would require an OSCP to be prepared for tugboats used for Project, would reduce this impact to unsubstantial.

<u>Avoidance and Minimization Measures</u>

AMM WQ-4a in Section 3.2, *Marine Water and Sediment Quality* would apply to this impact and would reduce it to unsubstantial.

<u>Rationale for Avoidance and Minimization Measures</u>

Prevention of fuel oil spills and minimization of spread of spills that do occur would reduce any potential impact to marine biological resources.

Table 3.3-10. Summary of Marine Biological Resource Impacts and Avoidance and Minimization Measures

Impact	Avoidance and Minimization Measures
MB-1: Sand Placement and Backpassing Impacts to Marine Resources	**AMM MB-1a.** Sand Placement Footprint Limitation **AMM MB-1b.** Rocky Subtidal and Intertidal Habitat **AMM MB-1c.** Monitoring for Grunion
MB-2: Backpassing Impacts to Marine Resources	**AMM MB-2a.** Sand Backpassing Limitation **AMM MB-2b.** Beach Habitat Management Plan **AMM MB-1c**. Monitoring for Grunion
MB-3: Dredging Impacts to Marine Resources	No AMMs recommended
MB-4: Construction and Vessel Impacts to Commercial and Recreational Fishing	No AMMs recommended
MB-5: Vessel and Noise Impacts to Marine Mammals and Turtles	**AMM MB-5a.** Marine Mammal and Turtle Contingency Plan
MB-6: Impacts to Marine Resources from Potential Fuel or Oil Release	**AMM MWSQ-4a.** Oil Spill Contingency Plan for Tugboats